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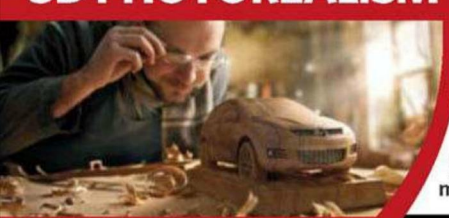
UNMASKING THE AMAZING VFX HEROES

3D masterminds reveal the secrets behind Marvel movies

Marvel's The Avengers • The Amazing Spider-Man • Thor • X-Men: First Class

50 TIPS FOR PERFECT 3D PHOTOREALISM



The elite share their advice inside...
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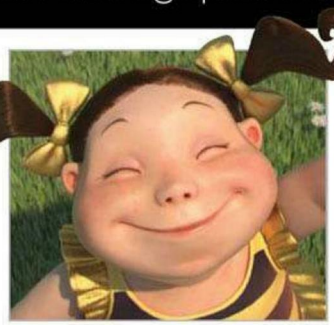
Essential skills to capture gesture and motion for more dynamic characters



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> It is a constant race to find better and more efficient ways of using the tools at hand to achieve the best and most effective VFX possibilities
>
> **Joan Panis**, FX lead, The Moving Picture Company **Page 26**

VFX heroes revealed!

Turn to page 26 for the feature

Anyone working in CG will find it notoriously difficult to watch a visual-effects fest in the comfort of the cinema without gasping in awe at the array of technological feats progressing at phenomenal speed from one movie to the next. Sure, Scarlett Johansson looks incredible in a tight-fitting Black Widow number, but it's the myriad of explosions, wormholes, earthquakes and mid-air battle sequences that really get a CG artist's heart racing.

So when your running commentary of proud technical know-how to the person next to you starts to fall on deaf ears (often with an added scowl), we can't help but wonder: does the average moviegoer truly understand the sheer scope of the work involved in these movies? While the actors strike a pose on the red carpet on opening night, receiving worldwide acclaim for their efforts, is anyone *really* paying respect to the quiet talents behind the scenes that breathe the life – and adventure – into their remarkable performances? We reveal all as the artists speak out on page 26...

Marking the release of *The Amazing Spider-Man*, we take the opportunity to talk to the skilful visual-effects studios behind the Marvel movies to find out exactly what goes into these impressive flicks. Turn to page 26 to discover how artists at Evil Eye Pictures, Luma Pictures, The Moving Picture Company, Pixomondo and Sony Pictures Imageworks keep up with the demands of increasingly VFX-savvy audiences.

Images courtesy of Sony Pictures Releasing

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Welcome

to the magazine and 116 pages of amazing 3D

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3. **A CD packed full of creative goodness**
4. Interviews with inspirational artists
5. **Tips for studying 3D or getting work in the industry**
6. The chance to see your art in the mag!

Welcome to 3D Artist magazine! It's that time of year again when graduates descend in their masses in search of exciting career opportunities, while companies jet to the States to strut their stuff at the SIGGRAPH exhibition. It's thrilling times all around – and this issue is no exception!

We welcome a new team member to **3D Artist**: news editor Chris McMahon brings us an adorable Liverpudlian twang with his many years' experience in games journalism. Jumping right in, he's been meeting and interviewing the artists, studios and manufacturers that help make our 3D world go around... That's when we can keep him out of the pub. I mean, gym. Enjoy!

Lynette Clee, Deputy editor

This issue's team of expert artists...

Fedde Souverein

Hailing from the land of bicycles, Fedde is here to teach us a thing or two about the art behind high-end commercial imagery

José Alves da Silva

When José released teaser images from this fantastic tutorial on Facebook, his fans went wild. You'll find out why on page 60...

Federico Scarbini

After working with this friendly Italian for years, it was great to bump into him in London (and talk him into doing a tutorial!)

Scott Eaton

We couldn't believe it when Scott gave into our constant tutorial pleas! Prepare to be amazed by his honed anatomy skills

Jahirul Amin

J is back! When he told us how hard it is to find realistic character rigging advice online, we got on it. Turn to page 80

Digital-Tutors

If you've fallen foul to dark and murky renders from Maya, you might just discover why in this helpful lighting Q&A

Gustav Melich

When he's not blowing things up or setting stuff on fire (in Houdini), our beloved firestarter is dabbling with fluid simulations

Kurt Papstein

Nabbing Kurt during his ZBrush 4R4 beta tests, he explains the Mesh Insert brush in R3 and reviews R4 for our inquisitive souls!

Roald Høyer-Hansen

"Make cloth move in Unity," we said! Never one to refuse a good challenge, Roald whipped us up a tutorial treat in Unity

Richard Tilbury

Who better to review Photoshop CS6 than 3DTotal's resident 3D and concept artist, Mr Tilbury? Hit page 96 to see what's new

Stanko Stupar

Winning the most awesome name of all time award, Stanko gets busy in After Effects CS6 to review all its new tricks

Orestis Bastounis

This self-confessed technology geek went under the hood of the HP Z1 system... that is, once he got it up the stairs (it's a beast)

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3D Artist

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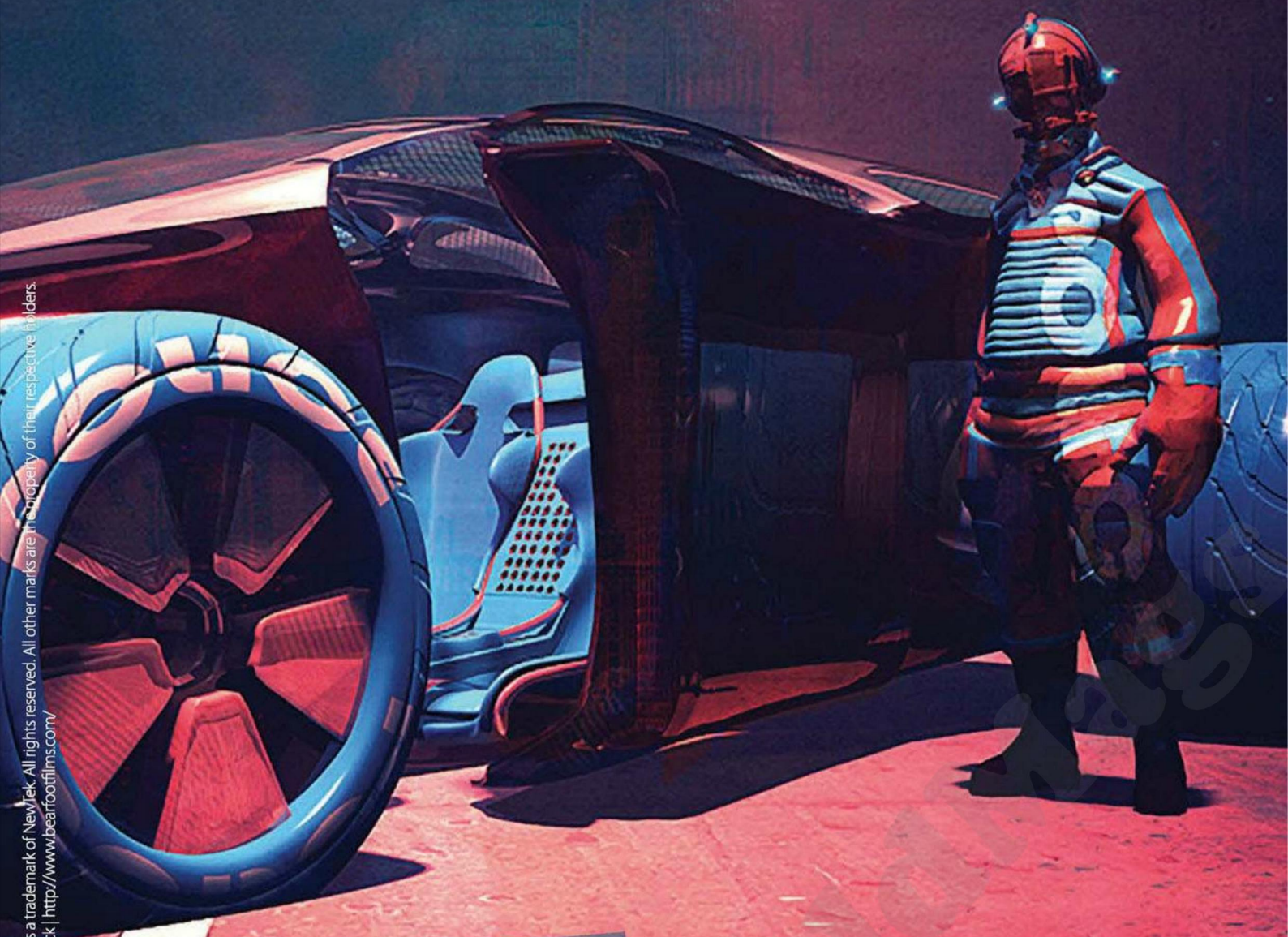

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Learn to add the touches that bring characters to life

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Artist info

Marlon Piloni
Art and graphic design student Marlon likes to use real animal references for his fantasy work

Personal portfolio site
www.behance.net/lon
Country Brazil
Software used
ZBrush, Photoshop

Work in progress...

"I am compelled to study modelling techniques using real animal features. Swamp Alien is one of the characters created with this process; the muscles are emphasised and the frog-like wet skin brings reality to the model"
Marlon Piloni, *Swamp Alien,* 2012

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The team loves

"The attention to detail in this image is incredible. It gives the character a very lifelike quality – we feel like we need to get off his porch!"

Chris News Editor

"The main reason for creating this portrait was to apply what I have learned. I made the character model and base textures as a demonstration in a ZBrush class… I wanted to express him as a realistic character"

Wang Min Chih, *An Elderly Curmudgeon,* 2012

Artist info

Wang Min Chih

Wang Min Chih is a freelance games character artist based in Seoul, South Korea

Personal portfolio site
http://roklywang.cgsociety.org

Country Korea

Software used
Maya, ZBrush, Photoshop, 3D-Coat

Work in progress…

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The team loves

There's a definite Pixar quality to this image, but the shadows and strange objects almost give it a surreal edge

Chris News Editor

Artist info

Lalit Kapoor

Working from his home in North India, Lalit is a 3D artist who loves learning new things

Personal portfolio site
http://tinyurl.com/ch6nl52

Country India

Software used
Maya, ZBrush, Photoshop

Work in progress...

WorldMags

The team loves

"An immediately striking image in its energy and dynamism, but also full of detail – note the heat stains on the glass of each individual vacuum tube"

Chris News Editor

"The idea for this image came from admiration for the first stereo hi-fi; equipment that was once an object of pride, but today is considered antique. The feeling that I wanted to give [in] this picture was of something old and dated but, despite its age, still alive and full [of] vigour"

Andrea Lazzarotti, *Full Power,* 2012

Artist info

Andrea Lazzarotti

Andrea is a 3D generalist whose credits include television commercials and videogames

Personal portfolio site http://farins.deviantart.com

Country Italy

Software used 3ds Max, V-Ray, After Effects, Photoshop

Work in progress...

WorldMags.net

The team Loves

This peaceful image expertly captures movement through the flowing hair and garments, while the character's expression and pose portray a sense of complete meditation

Lynette Deputy Editor

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Artist info

Sebastian Zimmermann

A digital character artist as well as a traditional sculptor, Sebastian lives in Berlin

Personal portfolio site
http://sebastianzimmermannart.com

Country Germany

Software used
3ds Max, Mudbox, ZBrush, Photoshop, Marvelous Designer, 3D-Coat, xNormal, V-Ray, After Effects

Work in progress...

Created to demonstrate my abilities as a freelance character artist, design-wise, this character is unique and distinctively bound to nature. The natural beauty of the human body is shown smothered in illustrious clothes to give him a god-like sublimity. As a former Crytek game character artist, I was new to V-Ray and [the plug-in] Hair Farm, giving me the chance to learn and enhance my skill set **Sebastian Zimmermann,** *Summoner of Nature*, 2012

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Original concept © VadimBakhlychev, http://slipgatecentral.cghub.com

Artist info

Lorenzo Actis Dato

Lorenzo is a character artist based in Vercelli, Italy. He boasts a degree in Graphic Arts

Personal portfolio site
www.3dload.it

Country Italy

Software used
Maya, ZBrush, Photoshop, mental ray

Work in progress...

The team Loves

"The detail of this sculpt is remarkable! We love that Lorenzo painted decoration onto the model and extracted the details using ZBrush's masking tools. Excellent work!"

Lynette Deputy Editor

"I was looking for a great knight concept to practise hard surface modelling [when] I found the Assassin concept by Vadim Bakhlychev, aka slipgatecentral. I tried to push the details, adding ancient Italian armour designs mixed with next-gen game art elements"

Lorenzo Actis Dato, *Assassin,* 2011

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'A Cautionary Tail' has some impressive voice talent on board, featuring David Wenham, Barry Otto and Cate Blanchett

Kickstarting creativity

How 'A Cautionary Tail', starring Cate Blanchett, got off the ground thanks to the generosity of the creative community

They say every cloud has a silver lining, and in this case 'A Cautionary Tail' is the brightest of silvers to the very darkest of clouds. Producer Pauline Piper remembers the incident that would lead to the creation of this 13-minute short: "Erica Harrison, an elite runner, was badly injured in a car accident in 2008. She couldn't walk for six months afterwards, and it was during this period of recovery that she wrote *A Cautionary Tail* as a children's book – a dark, funny fable about the loss and rediscovery of magic and about learning to treasure the things that make us unique."

A crew led by director Paul Perrott and a senior animation talent have been working on the project since, compositing CG characters into miniature sets to capture a quaint, storybook feel. "It's really interesting," says Perrott. "The sets themselves make up a hand-crafted world; the light is real, the buildings and props are real. Each object has a history behind it like anything that's made in the real world, and you can feel it. [It's] quite difficult to produce an illusion of that digitally."

"Camera layout was created using either MatchMover, or... Maya" says CG supervisor Mick Watson

CG and real-life elements have been combined before in productions like *The Gruffalo* and Aardman's latest animated adventure on the high seas

> "The beauty of crowdsourced funding is that small amounts can make a big difference" **Pauline Piper, producer on 'A Cautionary Tail'**

All of this was made possible thanks to the crowdsourced funding via Kickstarter. "We've been blown away by the generosity of the Kickstarter community," says Piper. "As newbies to crowdsourced funding we underestimated the support we'd get." 'A Cautionary Tail' gained half of its initial $40,000 target in just one week, and it didn't stop there. "We've been lucky enough to find three new associate producers through our Kickstarter campaign – they've come on board with a fabulous $5,000 each – but lots of people have been getting involved by chipping in whatever they can manage. The beauty of crowdsourced funding is that small amounts can make a big difference."

At the time of writing, the creators of 'A Cautionary Tail' have sourced enough money to complete animation, but are currently looking for more funds to start lighting, compositing, and to complete postproduction. Were they surprised by the support the project received? "In some ways no, in some ways yes," says Perrott. "I had a lot of faith in the story from the start and everyone I've seen that's brushed against it has been touched [and] wanted to help or be involved in some way. People have genuinely wanted to see this story told, and that's something I can relate to, along with the rest of the team." To learn more, visit www.acautionarytail.com.

A real boy

Paul Perrott discusses the challenge behind compositing CG characters into a real-life miniature set

"Using Maya as our 3D animation software we've developed an animation style to complement the world of beautiful miniature sets. We captured lighting references using a camera with a fish-eye lens placed in the set where the characters would be; these references were used to generate the lighting for our characters in Maya. Since this [resulted] in a perfect lighting [and] colour match, our characters [looked] convincing, which is critical to [focusing] on the story."

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Great success

'A Cautionary Tail' isn't the only project to have benefited from Kickstarter. Here are a few others that have found success through the crowdsourcing site

L'Ecorché: Classical Anatomy for Artists

$13,449 pledged of $8,000 goal

L'Ecorche is an intuitive reference tool for iPad and other systems developed by animation sculptor Michael Defeo and world-renowned anatomy expert Scott Eaton. It enables users to move, twist and pan anatomically-correct human figures, providing an immediate and tangible reference to the intricate beauty of the human body.

'The Tube'

$40,233 pledged of the original $22,000 goal

'The Tube' is a 3D animated short inspired by the Gilgamesh poem in which a female heroine rushes into a station in pursuit of a fragment of paper blown about by the passing of trains. This short has been created using free tools by a team of international artists closely collaborating over the internet.

Ravaged

$38,767 of $15,000 goal

The big videogame Kickstarter story came from Double Fine and Tim Schafer's unprecedented success in funding a new adventure game, but 3D titles have been reaping the benefits too. *Ravaged* is a post-apocalyptic multi-player title and, given that Kickstarter funds it, the creators have side-stepped the traditional publishing model, meaning they have full creative control.

Masterpiece

'Chapel in the woods'

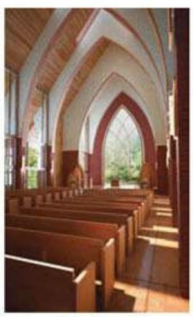
Kenny Syverson combines modo and Maxwell Render to craft tranquil architectural visions

Kenny J. Syverson www.behance.net/kennysyverson/frame

There's a beautiful and calming serenity to these architectural visualisation images by Kenny Syverson, the very first created for his 3D architectural artist portfolio. "I have always loved the field of architecture; it is very satisfying to see a project come to life," Syverson tells us. "When 3D started to take off in the architectural community, I saw it as the next logical avenue to pursue in my career."

This particular chapel is based on a real location, but Syverson chose to model it in a rather unfamiliar location. "This chapel is located at Agnes Scott College in Atlanta, Georgia. It was designed by architect Maurice Jennings of Fayetteville, Arkansas. I loved the design so much, with its heavy Fay Jones influences, I decided to model it. I felt it would be perfectly set in the deep woods as opposed to the college campus. I wanted to convey the feeling of someone walking in the woods and suddenly discovering a beautiful chapel."

Syverson's preferred software choices comprise of Luxology's modo for scene creation, and Next Limit's Maxwell Render for the materials and rendering. "These two programs work very well together, especially when it comes to architecture," Syverson finally reveals.



Modelling this real-life chapel in a rural rather than urban location makes it feel all the more soothing

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3D Sketchbook

Realistic bodies

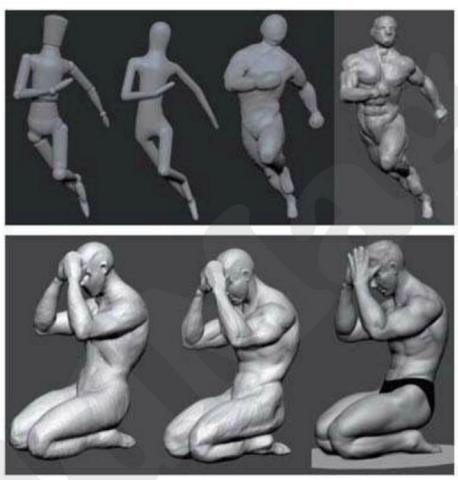
3D artist Wouter van Vugt talks us through the creation of anatomically-correct human models

Wouter van Vugt www.graphicvizion.com

Using ZBrush, Wouter van Vugt has created a series of stunning human models that cleverly mimic reality. "The most important thing... is anatomy; knowing why the body looks the way it does," Vugt says. "Learning anatomy does not, in itself, make you a great artist, but it does give you a strong base [from which] to become one."

In order to create his models, Vugt finds workable poses with a mannequin, then converts the figure to a DynaMesh object, using ZBrush's Clay and Move tools to start building. "First I focus mainly on volumes; at this point I'm not necessarily worried about anatomy. This is all very basic and takes less than a minute. It doesn't have to be perfect.

"After that I start blocking in big areas like the rib cage, hips, shape of the head, elbows and knees. When I am happy with the basic structure of the figure I start focusing more on muscle placement, blocking out the big muscles first and gradually moving into more detail and smaller muscles as I go along. In the end I smooth and clean everything, and add finishing touches like muscle fibre and veins."



Although photo reference is helpful, Vugt says that working without reference will help you "quickly find out what areas you don't have internalised yet and work on improving these"

Vugt explains why shape and form is just as important as detail

"Don't focus on details too soon; try to develop a strong structure for the base of your figure sculpts first. The strength of your structure determines, in a big way, the strength and visual attractiveness of your entire character, no matter how much detailing goes on top of it."

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Artist spotlight

Brazilian humour in 3D art

Prizing imagination and creativity over a reliance on software mechanics

Robson Santana da Silva www.robsonsantana.com

Born in São Paulo, Brazil, Robson Santana da Silva found himself addicted to cartoon animations as a child. As he grew older he discovered the design, art and illustration he loved so much could be more than just a hobby. "Since then, I've always tried to seek out information and knowledge about the topic," he tells us. "I started working with 2D illustration and fell in love with 3D at first sight when at college."

Santana graduated from a Digital Design course at São Paulo's Anhembi Morumbi University and then took further 3D classes at Melies School of Cinema and 3D Animation. He is currently working at an online agency, creating illustrations and 3D models for a wide variety of clients.

"I use Illustrator, Photoshop, Maya, ZBrush and more. I like to use Maya's non-linear deformers in the modelling process, and in ZBrush I like to create patterns in Alpha Channels to easily apply things like scars and scales to my models."

Santana believes that imagination is more important than technology. "I believe that with a good core concept, you can make it in any software," he tells us. Perhaps this is why his quality-control process is so simple: "I always show my work to my seven-year-old nephew. If he laughs, I'm on the right path."

"I don't have any specific theme in my works," says Santana. "I always try to keep my style rooted in simple and funny illustrations"

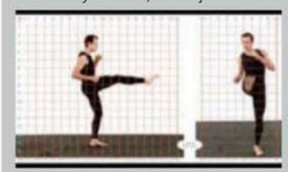
Free 3D Resources

Getting a good reference

Endless Reference offers a helpful sneak peak into its animation reference library

Free animation reference videos

Web: tinyurl.com/6wenjcc



Though most of Endless Reference's library comes at a cost, these free videos still contain plenty of insight

Animation library Endless Reference has made a new set of videos available for free on its YouTube channel. It currently features 20 individual moves, including walks, runs and martial arts moves. The recordings feature both male and female performers of varying ages and body types, and each is recorded from the front and side with an on-screen frame counter. Most are recorded in real-time, slow motion and with a grid overlay, making for a total of 64 separate videos. Endless Reference offers further material such as this from its own website, for a monthly subscription fee, at **www.endlessreference.com**.

SEE YOUR WORK HERE!
3D Artist Community
Contact **Chris** with your news: **chris.mcmahon@imagine-publishing.co.uk**

behind the scenes

With a vengeance

Efim Armand's Die Hard-esque chase scene saw this artist turn action movie director, all for education's sake

Efim Armand www.e-armand.com

Efim Armand's 'NYC Taxi' animation, which features one of the city's iconic yellow cabs speeding through the streets of Manhattan, was born not of an action-packed initial vision but from a desire to learn. "It came out of studying vehicle rigging and animation just for getting some knowledge about how it works," he says. "I studied a lot of car rigging tutorials, took all the best features and built my own rig scheme. The best way to test it and work out the advantages and disadvantages was to create some animation. That's how the 'NYC Taxi' animation came about."

Armand worked on the project in his free time for four months, using 3ds Max, V-Ray, NUKE, After Effects and Premiere. "The most difficult part was modelling the city blocks," he explains. "At first I made a low-poly scene with simple boxes, which was used to set up cameras and create animatics. After that I had a more detailed idea of what I needed to do. The environment was divided on foreground high- and middle-poly buildings and background low-poly models – mostly texture planes and boxes. That made the modelling process much faster.

"I don't really remember any real complexities with the vehicles," Armand concludes. "Those problems were solved as they appeared."

"It was a very interesting project for me because it was a great opportunity to learn more and overcome difficulties," says Armand

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Product of the month

A Limited Edition Rangefinder Cameras

» **Ilott Vintage**
Stockist: www.ilottvintage.com
Price: From $1,725
We say: These days anyone with an iPhone can call themselves a photographer, but there's something that much more sentimental about taking pictures when it comes to using film. If you agree, then you can't get much classier than Ilott Vintage, a company that takes classic mid-century rangefinder cameras and refurbishes them to working order, replacing their worn-out leathers with a stylish wooden veneer. Each camera is incredibly unique, one-of-a-kind and looks truly beautiful. They may be expensive, but they're as much collectors' items as they are equipment.

B The Art Of Gears Of War 3

» **Ballistic Publishing**
Stockist: ballisticpublishing.com
Price: From $65
We say: Following on from its excellent *The Art of Uncharted 2* and *The Art of God of War III* books, Ballistic Publishing is back with the latest entry into its videogame series with a celebration of the creativity and design behind Epic Games' *Gears Of War 3*. The game itself may very well be brutal and bloody, but the behind the scenes is triumphantly bursting with beautiful concept art and models!

C Adobe Collage

» **Adobe**
Stockist: www.adobe.com/products
Price: $9.99
We say: This new app from Adobe enables users to assemble creative moodboards, combining images, drawings, videos and text. The app enables users to search and import content from Google, Flickr and YouTube. Access is also offered to the Adobe Creative Cloud, which provides 2GB of cloud storage plus the ability to sync between tablet and desktop. So, if you're the disorganised type with a lot of ideas, this app is perfect.

D Moleskine Shells

» **Moleskine**
Stockist: http://store.moleskine.com/en
Price: From £17
We say: If you're looking for a way to keep your electronic devices safe, then Moleskine's range of soft protective shells for e-readers, tablets and phones are ideal. The case of each shell is semi-hard, waterproof and features a small loop for headphones to be passed through. Each shell also features a removal panel with various elasticated bands to hold devices in place, or objects such as pens and books.

E Radio Silenz

» **Tivoli Audio**
Stockist: www.tivoliaudio.com
Price: Coming soon
We say: Tivoli Audio has released Radio Silenz: the first active noise-cancelling headphones to feature wood housings rather than plastic. The high-performance 40mm drivers offer excellent sound quality with low resonance, and a unique Defeat button temporarily switches off the noise cancellation, gradually fading down the audio. The wood finishes are also available in black ash, walnut and cherry.

F Crosskase Solar 15 backpack

» **Crosskase**
Stockist: www.crosskase.com
Price: £140
We say: Going to SIGGRAPH but don't want your handheld devices to run out of juice? The Solar 15 backpack will help avoid depleted battery problems thanks to a thoughtfully designed 25-litre bag that recharges devices using either a high-capacity battery – which is itself charged through regular mains power – or through its handy solar panel. It can convert up to 3W in optimum light conditions!

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Image Courtesy of Ali Zafati
ZBRUSH
Avalable at your local reseller
Pixologic.com/resellers
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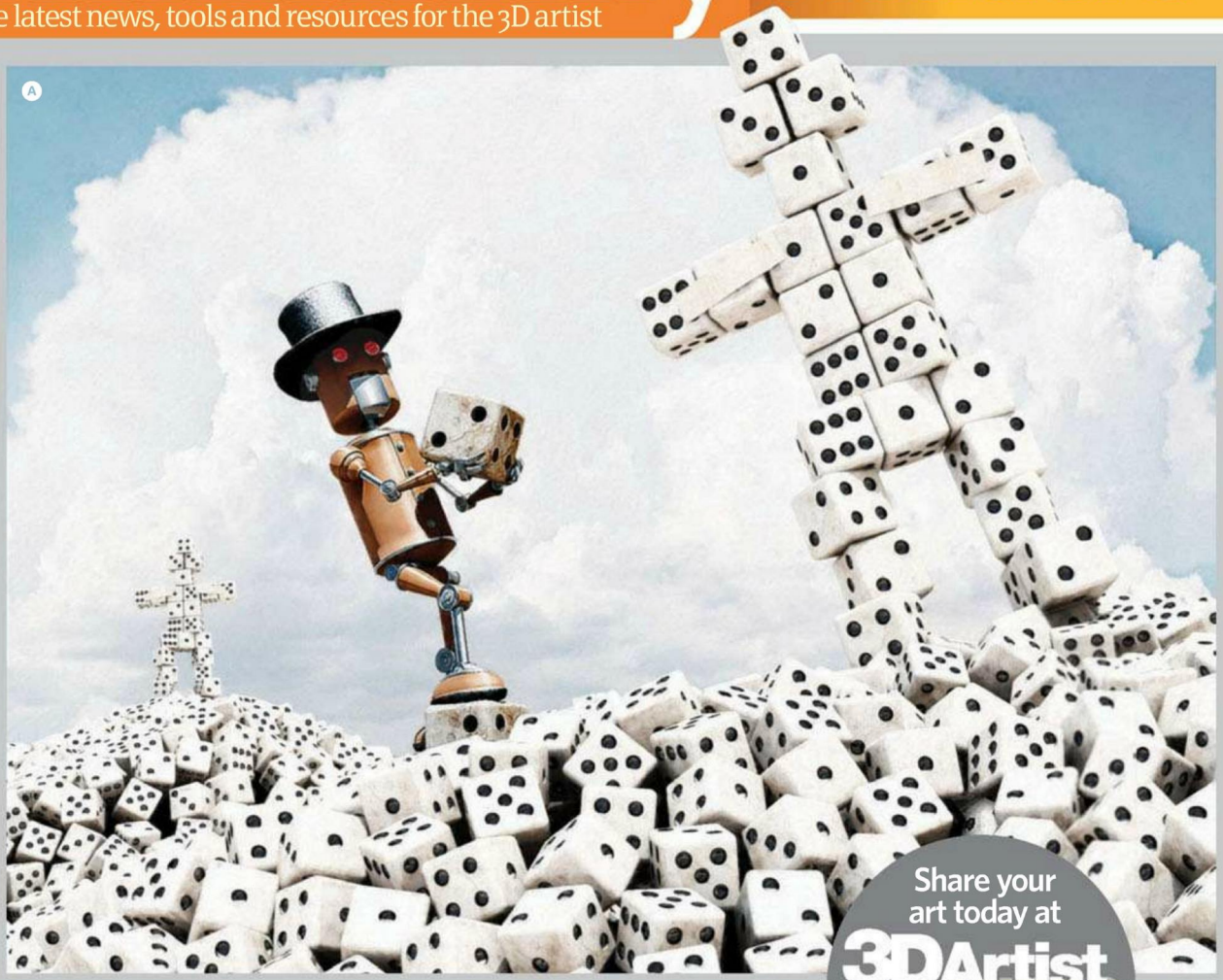

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Pictures of the week

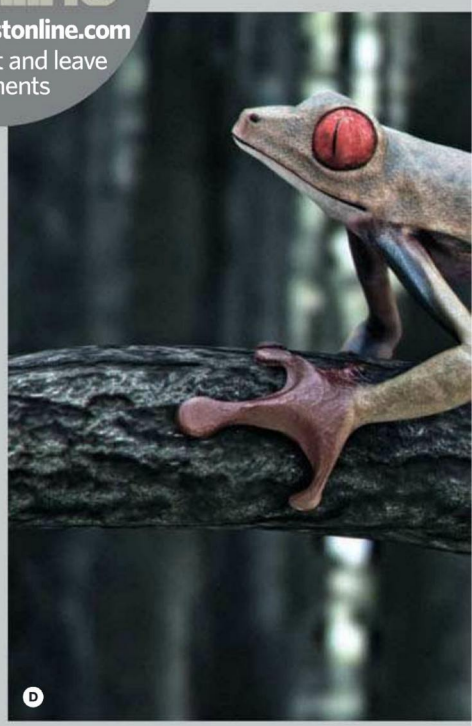
THESE ARE THE IMAGES THAT WERE AWARDED PICTURE OF THE WEEK IN THE LAST MONTH

A Need A Friend
» **Oliver Kieser**
Oliver says: "The Image was created in CINEMA 4D with post work in Photoshop"
We say: "We love that Oliver has taken his 3D render into Photoshop to give the piece an illustrative look"

B The Beggar's Chicken
» **Daniel Arnold-Mist**
Daniel says: "A personal model... created using Maya and rendered using V-Ray"
We say: "This is perfectly unique – and beautifully composed and rendered too"

C A Wolf in Sheep's Clothing
» **Kris Kelly**
Kris says: "[What] started off as an anatomy study became a project... to create a photoreal character"
We say: "Achieving photorealism in CG is the Holy Grail for most 3D artists. Kris has done an awesome job!"

D Frog in the fog
» **Jacek Blysz**
Jacek says: "I aimed for photorealism and I hope that the result is satisfying for the readers"
We say: "The branch could use a little extra love to up the level of realism, but we love this frog – great feet!"



Picture of the month

3DArtist 44
www.3DArtistonline.com
Practical inspiration for the 3D community

What's in next issue

Flying city
Neil Maccormack
Personal portfolio site:
www.bearfootfilms.com

Discover the skills to create futuristic cities...
Issue 45: on sale 15 August
To buy your copy, visit
www.imagineshop.co.uk

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Have your say

Get in touch via email, Facebook or Twitter to air your thoughts about the magazine and share your triumphs

You tell us

The readers share their joys and gripes @3DArtist

@3DArtist Ah, Mondays. What's everyone working on this week? Any exciting projects? :)

@stroggtank 3AM here in Mexico and already modelling some 3D characters :) Cheers!

@3DArtist @stroggtank Wowzers, are you modelling in your sleep? ;) Can't wait to see your next illustration – always a pleasure!

@ironmonkey_ If I order a subscription now would I receive issue 43 or would I have to order it as a back issue?

@3DArtist @ironmonkey_ Morning! If you subscribe today your sub will begin with issue 44, so you'll need to grab a copy of 43 separately. Thanks :)

@ruthmadeline When a magazine has 'Masterclass: Model architectural destruction' as an article, obviously I'm gonna buy it! @3DArtist pic.twitter.com/y6XB2tvm

@3DArtist @ruthmadeline The modelling destruction tutorial is also accompanied by some awesome video tutorial content on the cover disc too. Enjoy! :D

@kuzey3d @3DArtist what's with people putting animal heads on human bodies to create a monster? Don't people know body builders are already scary?

@3DArtist @kuzey3d The focus of this tutorial is on the creature head, so the body is used to give weight and amplify the awesome force of the scream!

Star letter

digital-tutors www.digitaltutors.com is a learning resource site boasting a library of 17,000 video-based CG lessons.

THE AUTHOR OF THIS ISSUE'S STAR LETTER WINS A MONTH'S FREE SUBSCRIPTION TO DIGITAL-TUTORS WORTH $45

3D with muscle

Hey, my name is Gagan Deep Singh and I'm just about to finish my university and apply for jobs. I've just finished a piece titled *Balance* and would like to know if it's worthy of being published in your magazine?

I've spent over one month working on this piece. The base mesh was done in 3ds Max, high-resolution details and PolyPainting were done using ZBrush, and postproduction was [completed] in Photoshop.

Gagan Deep Singh
http://gdsworld.cleanfolio.com

This figure strikes a truly complex pose, showing what applied knowledge of anatomy can achieve

Thanks for getting in touch, Gagan. We believe very strongly in the importance of anatomy for 3D artists to create more dynamic characters. This issue we have plenty of guidance for using anatomical knowledge in 3D work. It's fantastic to see such an incredibly athletic pose here! To help you on your way after graduation, we're giving you the Star Letter prize: one month's free subscription to Digital-Tutors to help you continue the learning after university. Best of luck!

Cézar's fantastic bust was featured in the Gallery section of issue 39

Greetings from Brazil

Hey Lynette, how are you?
Got the magazine today, very cool. I'm sending a picture.
Thank you very much.

Cézar Brandão

Thanks for the pic Cézar, it's always lovely to put faces to the artists featured in the magazine. After a few troubles getting magazines out to Brazil, we're also really pleased to see the magazine arriving with its rightful owner. We look forward to your next masterpiece!

You can find out how to subscribe for future issues and get 20 back issues absolutely free on page 92

Oops!

Sending out sincere apologies to Joseph Robson and Davis Engels for name misspellings in recent issues. Joseph is the president of SAI, featured in the Inspiration Corner of issue 43's Community section highlighting the architectural exhibition that can now be seen at ***www.sai.org.uk****. Davis graced the pages of issue 42 with his stunning* Gjaldir the Spirit Hunter *image in the CGWorkshop's Becoming a Better Artist Course Focus article. Sorry guys!*

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UNMASKING THE VFX

THE AMAZING SPIDER-MAN

Spider-senses tingle as The Amazing Spider-Man hits the big screen

The Amazing Spider-Man sees Andrew Garfield play a leaner, slightly darker reboot of the superhero series. It's back to square one this time, with Peter Parker an everyday student that happens to get bitten by a radioactive spider, imbuing him with the pre-cognitive abilities and sticky limbs of an arachnid. While exploring his newfound powers in the pursuit of justice, he finds a clue that could shine light on his parents' disappearance when he was young. Following the trail puts Peter on a collision course with his father's former partner Dr. Curt Connors, who fans of Spider-Man will also know by another name... The Lizard. *The Amazing Spider-Man* was released at cinemas in the UK on 3 July 2012.

"WE TRIED TO MAKE SURE HIS MOVEMENTS WERE TRUE TO HIS PERSONALITY, LITERALLY DOWN TO ANIMATING HIS FINGERTIPS THE RIGHT WAY"

Adam Watkins, *CG supervisor, Pixomondo*

Photo by Peter Tangen.
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AMAZING HEROES

Images courtesy of Luma Pictures
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Images courtesy of Luma Pictures
Even when played by an actor, Captain America's powers are often enhanced with VFX

Chris McMahon goes behind the scenes of the Marvel movies to uncover the real superheroes that breathe life into the flicks with their visual effects mastery

When the packed audiences watching *The Amazing Spider-Man* slowly filtered back onto the streets outside, the conversations between groups of huddled friends no doubt centred on the dazzling look of the film; the spectacular action sequences, the realistic, slimy scales of The Lizard. But did they talk about the fine detail that went into the ruffles of Spidey's costume? Did they discuss the refractive qualities of his webbing? Did they truly appreciate the effort that went into achieving such precise details?

These are the questions flitting through our minds as we sit down with Luma Pictures, the VFX production house responsible for such sequences as Thor's hard-won battle against the armour-plated Destroyer in 2011's *Thor*, and that recently aided in building out S.H.I.E.L.D.'s Helicarrier in *Marvel's The Avengers*. Does the studio think that audiences have any idea of the amount of blood, sweat and tears that actually goes into bringing such superpowered sequences to life? "We certainly hope they don't," announces CG supervisor Richard Sutherland, surprising us with his humility. "If the work is too obvious then we haven't done a good job of it!"

While many of the effects in *Marvel's The Avengers* will always be of such extraordinary quality that no one would interpret them as being real, there are still a great many that should be invisible to the audience. Take Luma's work compositing Hawkeye's CG arrows into shots, for example; or the huge bridge set extension and glass panel monitors on the Helicarrier; or the blue skies outside of its broad bay windows. "You would hope people wouldn't immediately realise that it's a visual effects shot," continues Sutherland. "There's an enormous amount of stuff like that in *Marvel's The Avengers*, so much so that I've watched it several times and I'm sure even I've missed a lot of the visual effects work because it's just of such a high level of quality."

This is the real role of the artists and animators at vendors like Luma. They have to work under the radar, tricking the audience into believing the spectacle on the screen is real. Like the superheroes themselves they don't need to be identified or appreciated; they're to be concealed, hidden and unknown. They're the real heroes, and in many ways the work they do to bring these creations to life is no less of a superhuman feat than the actions we enjoy on screen.

CREATING CG HEROES

They're the centrepieces of the films we watch – the reason we go to see them. They're Iron Man, the X-Men, and most recently, Spider-Man. They're the characters, and the amount of work that goes into bringing them to life is huge.

"For *The Amazing Spider-Man*, there was a directive from Marc Webb (the film's director) that he wanted a much more gritty and realistic feel," explains Dave Smith, who is a digital effects supervisor at Sony Pictures Imageworks. "We matched physical and simulated characteristics, where the suit wrinkled independent of his skin underneath, and there were things done like adding piling and fibres to the seams

Dan Rosen

» VFX supervisor, Evil Eye Pictures

EXPERTISE Visual effects

BIO Rosen is co-founder and visual effects supervisor at Evil Eye Pictures. He was associate supervisor at ESC Entertainment and worked on *The Matrix Revolutions* and *The Matrix Reloaded*.

Raphael A. Pimentel

» Animation supervisor, Luma Pictures

EXPERTISE Computer animation

BIO Pimentel is both an on-the-box animator and supervisor of all animation at Luma Pictures. He graduated from the Art Institute of Miami in 2003 before joining Luma in 2005.

Richard Sutherland

» CG supervisor, Luma Pictures

EXPERTISE FX, lighting and compositing

BIO Sutherland is a VFX artist currently living and working in LA. Since starting at Luma Pictures in 2006, he has worked on 23 films including *Thor*, *X-Men: First Class* and *Marvel's The Avengers*.

Vincent Cirelli

» VFX supervisor, Luma Pictures

EXPERTISE A knack for surrounding himself with smart, inventive people

BIO Cirelli is the supervising creative at Luma Pictures with more than 40 films to his credit. Prior to joining in 2004, he was an award-winning creative director.

Joan Panis

» FX lead, The Moving Picture Company

EXPERTISE Designing and creating effects like fire, smoke, dust and water

BIO Panis graduated with a diploma of Screen, Computer Graphics and Animation in 2005. He joined MPC in 2010 and worked on *Prometheus*.

Dave Smith

» Digital effects supervisor, Sony Pictures Imageworks

EXPERTISE Digital effects

BIO Smith began his career as a runner at Boss Film studios in 1991. He also worked at Warner Digital before joining Sony Pictures Imageworks.

Randall Cook

» Animation supervisor, Sony Pictures Imageworks

EXPERTISE Animation

BIO Cook began his career by applying to the Animation Training Program at Walt Disney Studios. He then worked on films as diverse as *Ghostbusters* and *The Thing*.

Boris Schmidt

» VFX supervisor, Pixomondo

EXPERTISE Creating full CG shots

BIO As visual effects supervisor, Schmidt has been working at Pixomondo since 1998. When working on *The Amazing Spider-Man* he oversaw the creation of several high-profile action sequences.

Adam Watkins

» CG supervisor, Pixomondo

EXPERTISE CG pipeline design and implementation, CG environments

BIO Watkins started at Pixomondo in 2011 in the core team working on Martin Scorsese's *Hugo*. He won a Satellite Award and a VES Award for his work.

Robin Graham

» Compositing supervisor, Pixomondo

EXPERTISE Balancing big effects with small details

BIO Graham joined Pixomondo in 2012 to work on key action sequences for *The Amazing Spider-Man*. He won an Emmy in 2006 for his work on *The Triangle*.

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Given that The Lizard talks a great deal in *The Amazing Spider-Man*, his lips needed to move realistically

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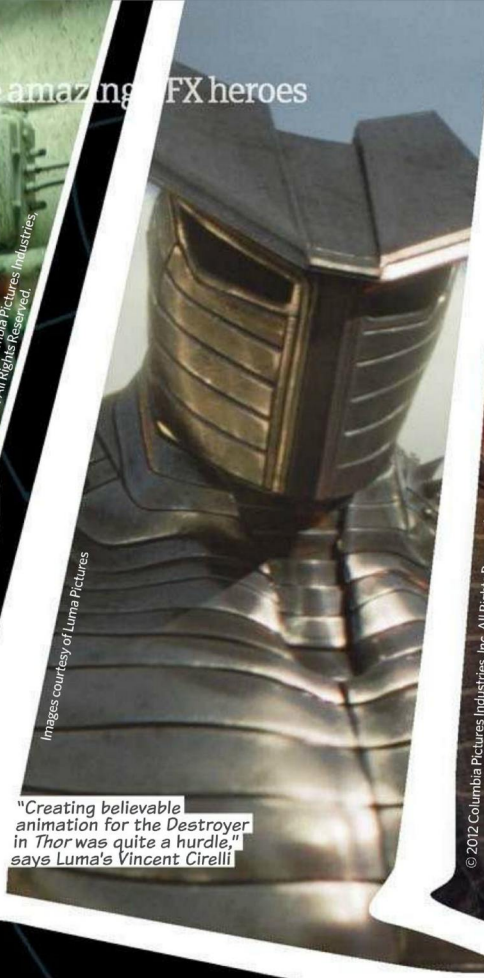

Images courtesy of Luma Pictures

"Creating believable animation for the Destroyer in *Thor* was quite a hurdle," says Luma's Vincent Cirelli

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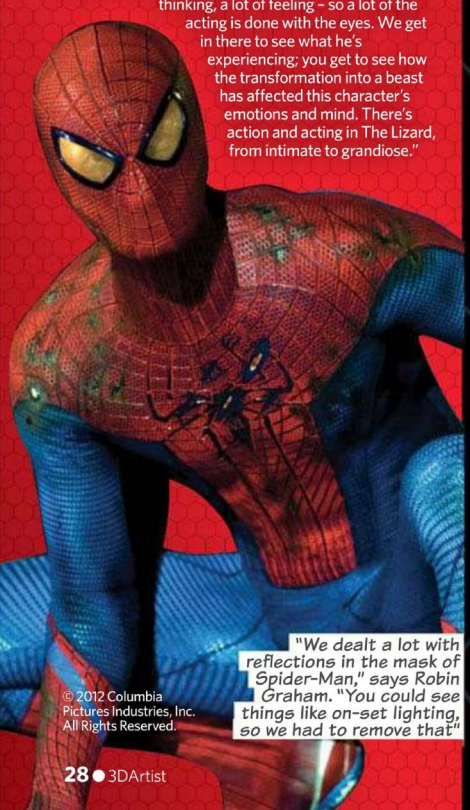
TERRIBLE LIZARD

Sony Pictures Imageworks' animation supervisor, Randall Cook, tells us how to instil a ferocious human-lizard hybrid with a real sense of pathos

"The Lizard is basically a tyrannosaur from the tip of his toes to his waist, and then human from there up, as far as the base anatomy is concerned. Despite his significant size and weight he is nevertheless able to climb very vigorously like a lizard, so he gets to do a few things that you haven't seen in this kind of film.

"However, the character's actions also have to be reflective of the performance of Rhys Ifans. He's playing the Dr Jekyll to The Lizard's Mr Hyde, so we've got to be faithful to Rhys' intentions and consistent with his character. The Lizard does a lot of thinking and emoting facially, and as such the director wanted us to do a lot of close work on his face – a lot of thinking, a lot of feeling – so a lot of the acting is done with the eyes. We get in there to see what he's experiencing; you get to see how the transformation into a beast has affected this character's emotions and mind. There's action and acting in The Lizard, from intimate to grandiose."



"We dealt a lot with reflections in the mask of Spider-Man," says Robin Graham. "You could see things like on-set lighting, so we had to remove that"

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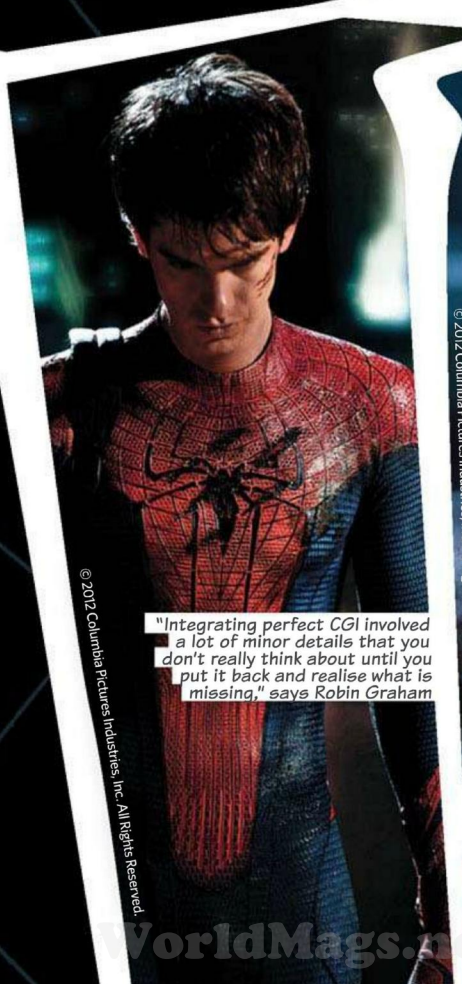

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"Integrating perfect CGI involved a lot of minor details that you don't really think about until you put it back and realise what is missing," says Robin Graham

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"The real challenge is to keep the audience engaged, otherwise you confuse them," says Imageworks' Randall Cook

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Images courtesy of Luma Pictures

Luma Pictures also created effects for the Bitfrost in *Thor*, and the armour morph in *Marvel's The Avengers*

Images courtesy of Luma Pictures

> "Spider-Man's nemesis was a challenge for the artists and animators of Imageworks, to feel like a real and believable creature"

of the suit, so it didn't have a perfect CG look to it. We were able to get very close up to the face on his suit so you could see those details that felt really natural, with a dirty, gritty quality to them."

It wasn't just the man that needed to feel realistic, however, but his powers too, with Imageworks' effects team spending many weeks perfecting the look of Spidey's gooey, sinuous web material. "We almost think of the web itself as a character," says Smith. "In this film it shoots out of a device that Peter Parker creates, so we tried to give it some properties that were both naturalistic but also engineered. We studied things like polymers and glue guns – you can melt the glue and stretch it or make a blob out of it – and gave the webbing a little bit of that man-made quality. We also worked on the way it responded to light; it has a lot refraction and reflection to the surface so occasionally, close up, you'll get to see how light filters through the web. We play with photographic effects such as chromatic aberration to play up some colour, with the reds and blues of Spider-Man's costume reflecting in it."

Animation is also a huge component when it comes to creating such realistic characters. "We want to keep everything reality-based of course, but it's the reality of someone who is capable of performing unreal feats, as opposed to the reality of someone who is pushing a shopping cart down a supermarket aisle," says Imageworks' animation supervisor Randall Cook. "We studied footage of great gymnasts, and [we could] really see them extend themselves to a great degree... they can push their bodies to do things that are wondrous and extreme. So we evoked those things but pushed them that little bit further in *The Amazing Spider-Man*."

Adam Watkins, CG supervisor at Pixomondo and also partly responsible for animating Spider-Man, reinforces the importance of animation when it comes to imparting personality. "We tried to make sure his movements were true to his personality, literally down to animating his fingertips the right way," he says. "Did Spider-Man's hand release an object like he's giving up, or like he's desperately trying to hold on at all costs? It's really important to get it right."

BRINGING CG CREATURES TO LIFE

Wherever there's a hero there's rarely a villain far off. Thirty years ago an actor with a dastardly moustache might have done the trick, but the ever-increasing expectations of the contemporary cinemagoer mean this is no longer good enough. Modern-day superhero villains must be completely unique creations never seen before, meaning creature development is becoming an increasingly intricate component of the genre's postproduction process.

Luma's certainly aware of this, given that it was entirely responsible for the creation of the Destroyer battle in last year's *Thor*. "We were provided with initial concept art and some 3D sculptures from Marvel," remembers Richard Sutherland, CG supervisor of the half-god-half-robot creation. "Then we asked our concept artist Loïc Zimmermann to do a little bit more detailed analysis of some particular areas – mainly the bendable ones: the elbows, the groin and the neck – to play with how the Destroyer's metal plates would slide under one another."

It was these metal slats that posed the real challenge. "We had three modellers that worked on the individual slats to get them the right shape and the right curvature, to make sure they didn't have a kind of disco-ball effect," says Sutherland. "If they were too flat then you'd get these really broad points of reflection. If they were too curved it would look like a Michelin Man. A lot of time was spent getting the curvature of those slats correct.

"We also had quite a few artists invested in painting the small dings and battle damage," he continues. "It was supposed to be an indestructible creature so we didn't want to beat it up too much, but if it was too chrome-y then it would just look fake. So finding the right balance of dirt and damage, to get both the feeling that it was indestructible but also realistic in that environment, was a task with several people dedicated to it."

Spider-Man's nemesis was a similar challenge for the artists and animators of Imageworks, to feel like a real and believable creature. "For the Lizard, a lot of concentration was put into the details," says Imageworks' Dave Smith. "On some of the close-ups you'll see some of the crud between his scales,

CREATING DESTRUCTION

Luma Pictures animation, CG and VFX supervisors discuss the challenge of bringing Thor's battle against the Destroyer from conception through to the finished product

Raphael Pimentel, animation supervisor, Luma Pictures
"Everything has to be sold from a movement, an action. So, what we did was evoke Loki's mannerisms, and his condescending demeanour. That's why when you see the Destroyer walking across town his chest is open, his chin is up and he feels like he's indestructible."

Richard Sutherland, CG supervisor, Luma Pictures
"We created a library of effects and rendered them out from various camera angles. Our compositing team could place those elements in 3D space using NUKE. As the sequence evolved they could add or remove fire and smoke without needing to go back to our effects team."

Images courtesy of Luma Pictures

Vincent Cirelli, visual effects supervisor, Luma Pictures
"There are a few shots where the character Sif jumps onto the Destroyer's back. We MatchMoved her, and then re-projected the plate of her onto our Sif digital double. We had textures for her digital double too, so we combined that with a CG render of her, and the result is what you see reflected in the Destroyer."

Roughly 15 people worked on the Beast-transformation shots in *X-Men: First Class*, with input from all areas

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"Shooting on green-screen stages allows for lighting and scheduling control," says Evil Eye Pictures' Dan Rosen

Images courtesy of Luma Pictures

Images courtesy of Evil Eye Pictures

Images courtesy of Luma Pictures

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HEROIC ACTIONS

Pixomondo's compositing supervisor, Robin Graham, talks through one of The Amazing Spider-Man's most striking shots, in which Spidey must save a boy from a car hanging from a bridge

"There were a number of shots where the viewer is inside the dangling car and looking up towards the bridge. To achieve this we re-created the entire bridge set using NUKE's 3D system. We simulated the movement of the car, how it would rotate and would sway back and forth... We didn't render anything from this, we just exported the animation into NUKE and created an elaborate system to attach the MatchMove camera to this dangling point in space. We added the bridge in the 3D space and then added multiple layers of smoke, fire and Spider-Man's web. Essentially, we created a machine for the sequence so we could just pass in the MatchMove camera, determine how much sway we wanted and where the web was attached on the car... It simulated the sparking of the web, the rotational movement of the car, the smoke and fire. We spent a good amount of time setting up this system in NUKE and I think in the end it really helped a lot."

and we even created small flakes and stuff that falls off the character to make him feel real.

"However, the look-development team's real challenge was to get that sense of depth in the skin area of the eyes – not just the eyeballs," he continues. "Lizards can have a rough outer shell to them, but we put just little touches of soft tissue around the eye area, making for a complex organ that matches the physiology of a real eye. It was working on that area that I think made it feel like there was real life going on behind the geometry."

MAKING REALISTIC SETS

When discussing environments in superhero movies, your first thoughts may be of the coruscating spectacle of *Thor*'s Asgard, or the far-flung cosmic swirls of *The Green Lantern*. However, in reality, just as much work goes into the mundane aspects of the films as the eye-catching and spectacular ones.

In the case of *The Amazing Spider-Man*, Imageworks was responsible for creating various CG environments where the titular character and the Lizard do battle, such as on a rooftop, in a sewer and in a school. "Part of the scene takes place in a real high school, and that's a nice action sequence full of stunts," says Smith. "However, as the battle gets more climactic we went all digital with that scene. We re-created a classroom down to the books in lockers and the hinges on those lockers; every fine detail that was in the set piece we created in full CG. It gave us the opportunity to go a little more dynamic with the interactivity of the characters in the environment."

On *Marvel's The Avengers*, Luma Pictures was responsible for creating all the CG extensions of the Helicarrier bridge set. "It was a really interesting sequence," says Vincent Cirelli, visual effects supervisor. "The set they had built up was simply amazing, with detail going down to the scuff marks on the ground and railings.

"They had only built a section of the bridge, the first floor, so we were responsible for creating everything above that: all the catwalks, ceilings and everything outside the huge bay windows. They delivered volumes of reference data on what they had done with the textures and things they had built out on set, and it was our job to replicate that. You can imagine the amount of texture data we needed, in order to seamlessly integrate our CG next to their photography."

Evil Eye Pictures was responsible for fleshing out another part of the Helicarrier: "For those shots overlooking the Helicarrier atrium there were a lot of elements that the audience may have taken for granted," says Evil Eye's VFX supervisor Dan Rosen. "There was the movement in the clouds, which is very subtle, but we worked on that a great deal to have a sense of the ship's massive scale and altitude. We also did a lot of work on digital doubles to create the sense that the corridors outside were populated. Finally, there are the monitors. I could imagine that audience members think that the graphics are being fed into the monitors during the shoot. In fact, we did a great deal of colour and animation tweaks to the graphics to keep continuity, and the audience's attention on the right thing at the right time.

"Audiences are more and more savvy to visual effects, but of course if we do our job well then those things don't take the viewer outside of the film," Rosen concludes.

SETTING THE SCENE WITH VFX

When it comes to impressive spectacles in superhero movies detail is key, and that's where FX leads like Moving Picture Company's Joan Panis come in. "It's always a question of detail," he tells us. "We want to

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Images courtesy of Luma Pictures

According to Evil Eye Pictures' Dan Rosen, matte paintings are used a great deal in today's superhero films

"We have to match the reality exactly: the shading, lighting, fire, smoke: everything in the shot," says Adam Watkins

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"SOMETHING WHICH IS SLIGHTLY TOO BIG OR TOO SMALL, TOO SLOW OR TOO FAST WON'T LOOK REALISTIC"

Joan Panis, FX lead, Moving Picture Company

create the biggest and best battle scenes, with the tiniest of details addressed."

Case in point: Panis's work on last year's *X-Men: First Class*. "On an effects heavy sequence like Magneto's attack on the yacht we had around 15 artists working on it. This involved supervising the sequence, modelling and texturing the yacht, camera tracking, laying out the scene, animating the anchor, simulating the FX elements, lighting and matching the plates, compositing all of the elements together and grading the final shot."

According to Panis, it's speed and scale that are the most important factors in making shots such as this feel believable. "Something which is slightly too big or too small, too slow or too fast won't look realistic," he explains. "In the *X-Men*-yacht-destruction sequence the anchor had to be animated to look as if it were hitting the different sections of the boat with realistic [physics].

"It's all about adding additional meticulous secondary detail; the anchor slightly wobbles after impact, the splashes create secondary ripples on the water and the tearing metal of the yacht had to have a kind of can-opener aluminium feel," Panis continues.

Of course, no action scene is complete without a good helping of destructive elements, which often help give scenes such as this a tangible sense of physicality. "In the case of the yacht sequence we had to amplify the wake of the anchor's destruction," says Panis. "In reality it would probably have just made a small hole rather than create such a visually striking scene. As such, we had to have full control on the tearing of the metal, smashing glass and splintering wood."

The Moving Picture Company achieves this with a destruction toolset based on DMM Kali. Panis explains: "It dynamically shatters and destroys objects, removing the need to destroy or pre-cut models in advance. It makes rendering a little heavier but the results are stunning. For water simulations, as well as smoke, fire and explosions, we use Scanline's Flowline. It's one of the most advanced fluid solver simulation packages used."

As artists at any level in the movie VFX business will tell you, every shot is different, no two challenges are the same, and those responsible for taking a concept from imagination through to the final piece will always be looking to surpass their previous work. "It's a constant race to find the best and most efficient tools at hand to achieve the most effective possibilities," concludes Panis. "We're always pushing at the boundaries of what can be achieved."

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ROOM WITH A VIEW

Evil Eye Pictures' VFX supervisor Dan Rosen gives an in-depth walkthrough of the work that goes into creating background environments for movies

"Our work on the background environments started in MatchMove and layout. We use PFTrack for most of our MatchMove and passed that into Maya to set up layout scenes that validated the horizon line."

"We used a Helicarrier model with simple contour shading and a giant sphere to show the sky and horizon line for layout renders. We then had the compositors run slap comps in NUKE."

"Our pipeline relies heavily on NUKE... The 3D tools give the compositors and technical directors the ability to easily add an element that tracks perfectly based on the MatchMove camera and geometry for the shot."

"NUKE's 3D tools enabled us to create a pipeline of intricate projections. We used projections of stitched photographs tiled together for highly detailed photo-based environments, matte painting... and more."

"We used projections to render large-resolution CG and re-project those renders onto the geometry. We used this technique on *Marvel's The Avengers* to render the Helicarrier in two large-resolution images."

Images courtesy of Evil Eye Pictures

"This enabled us to get the last ten per cent of finessing done to articulate paint in Photoshop. We used Photoshop heavily to generate sky domes and sprites of clouds [and] added moving CG clouds using Houdini."

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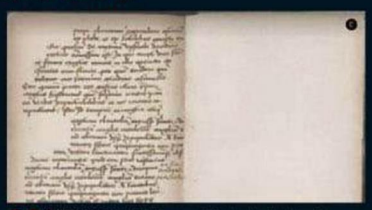
Prepare and find references

Search for useful inspiration and look for textures

01 Skull reference One of the first important things we need to do is find a nice-looking skull that will form the base for our project. Using Google we can look around until we found something that fits our vision of what the book should look like. This process also helps us to understand that the teeth and sockets of the skull should be pronounced in the book, in order to keep the skull shape interesting.



02 Texture the pages Having a good base texture is extremely important for a project such as this, so we have to create a high-resolution texture of an old book with handwritten text, as the final image will show the book close up. In our studio's texture database we have an image of an old book (note the importance of collecting and keeping good texture materials) that we can use as the base for our main paper texture. We also need the handwritten text (which we get from a picture of an old letter) to be combined with the old book texture in Photoshop.

Concept

It was decided that we'd create the diary of a pirate explorer shaped like a skull. This is a mysterious looking book that could have been owned by an adventurer. Giving it a warm and clean look keeps it away from becoming too grim-looking and retains the realistic feel we're after.

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EXPLORE THE 3D WORLD

Words by **Poz Watson**

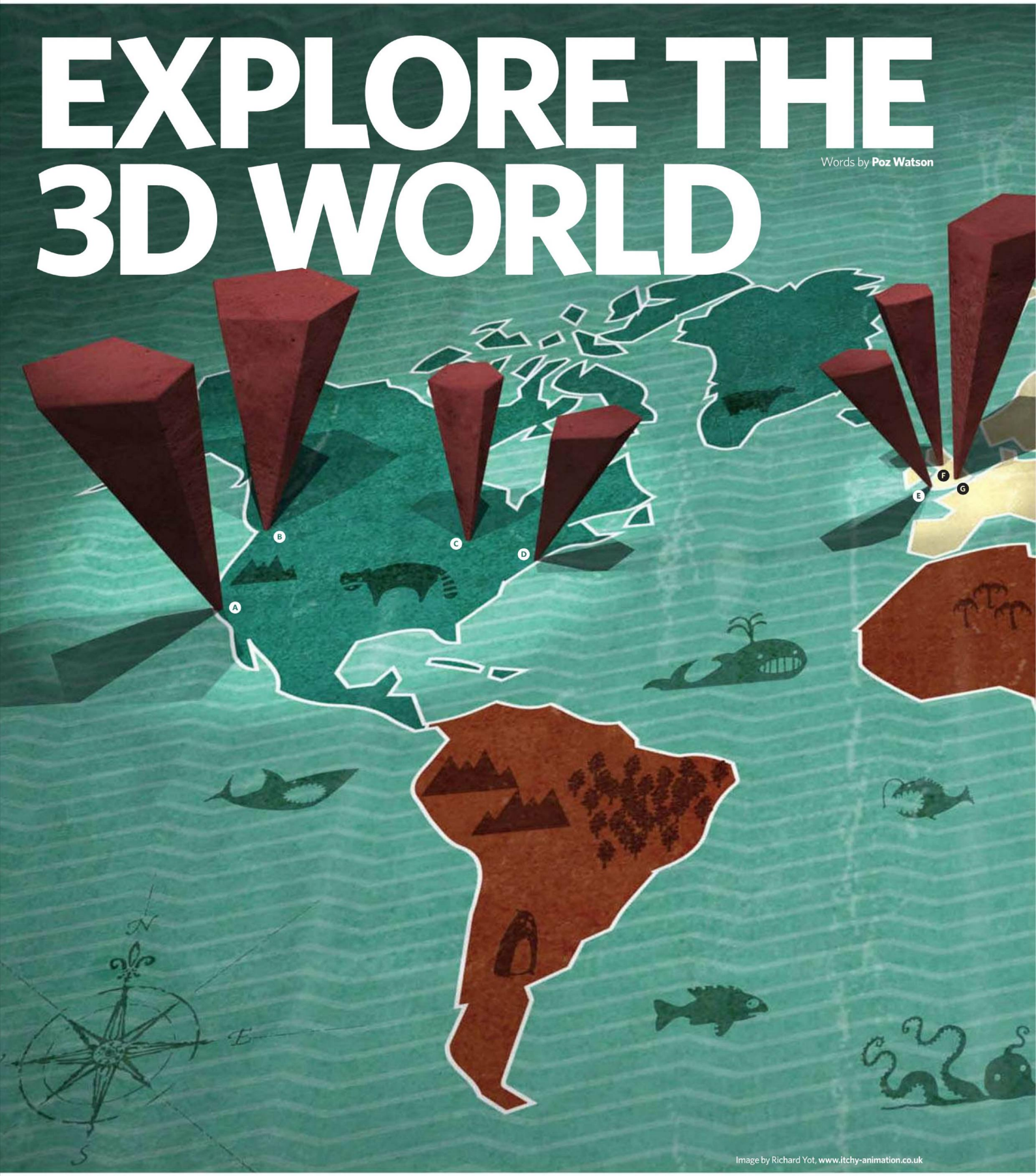

Image by Richard Yot, www.itchy-animation.co.uk

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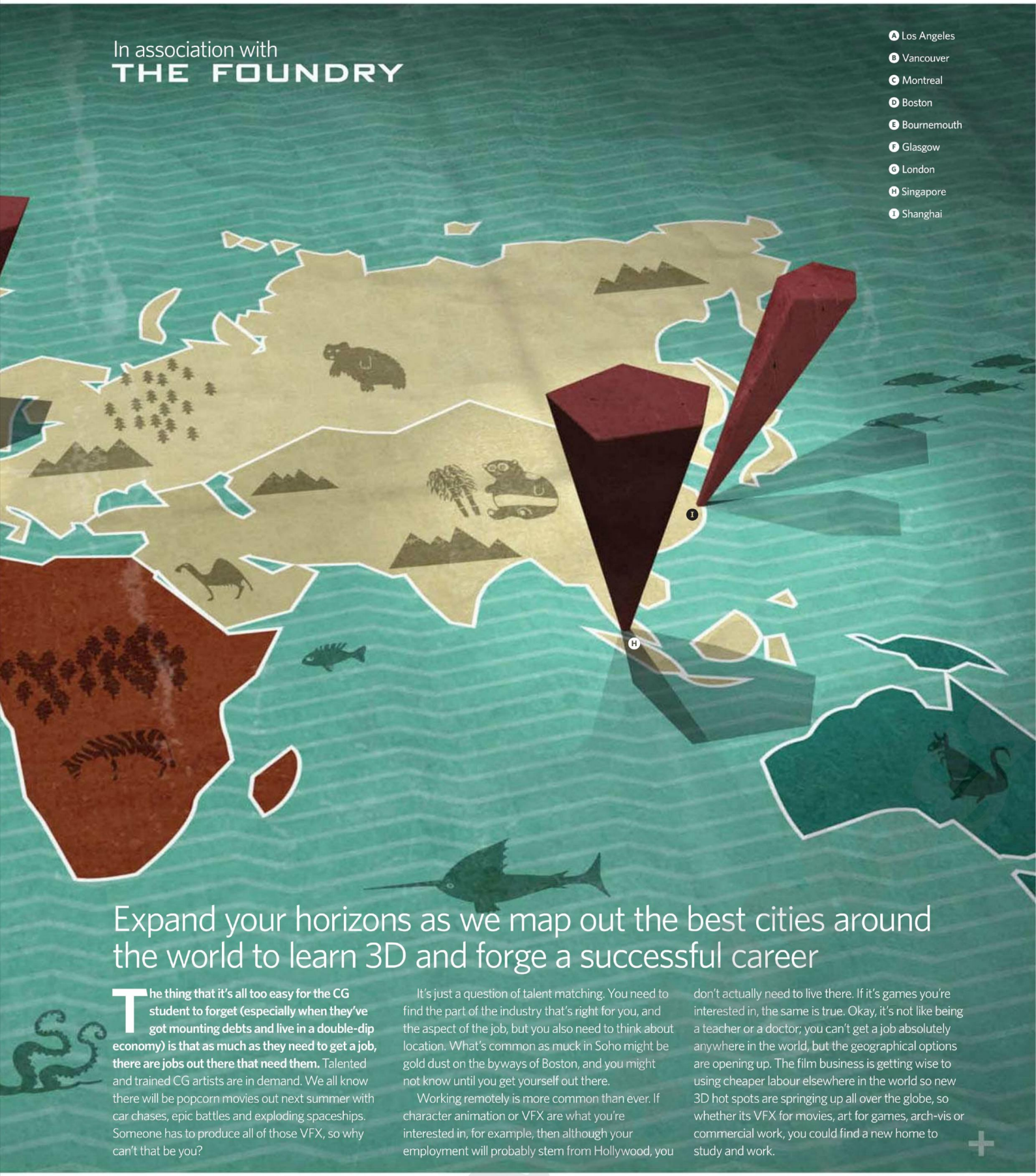

Expand your horizons as we map out the best cities around the world to learn 3D and forge a successful career

The thing that it's all too easy for the CG student to forget (especially when they've got mounting debts and live in a double-dip economy) is that as much as they need to get a job, there are jobs out there that need them. Talented and trained CG artists are in demand. We all know there will be popcorn movies out next summer with car chases, epic battles and exploding spaceships. Someone has to produce all of those VFX, so why can't that be you?

It's just a question of talent matching. You need to find the part of the industry that's right for you, and the aspect of the job, but you also need to think about location. What's common as muck in Soho might be gold dust on the byways of Boston, and you might not know until you get yourself out there.

Working remotely is more common than ever. If character animation or VFX are what you're interested in, for example, then although your employment will probably stem from Hollywood, you don't actually need to live there. If it's games you're interested in, the same is true. Okay, it's not like being a teacher or a doctor; you can't get a job absolutely anywhere in the world, but the geographical options are opening up. The film business is getting wise to using cheaper labour elsewhere in the world so new 3D hot spots are springing up all over the globe, so whether its VFX for movies, art for games, arch-vis or commercial work, you could find a new home to study and work.

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Image courtesy of Pixomondo

Martin Scorsese's *Hugo* was shot and shown in 3D, which gave the VFX team at Pixomondo an extra set of challenges

USA

LOS ANGELES

For many, Los Angeles – or at least the US as a whole – is still the most exciting place to be. As CG artist Gavin Goulden (**www.gavimage.com**) explains, "I feel like there are a lot of opportunities in the US." He adds that despite layoffs in some areas, "there are new studios being formed, the major players in the industry are rooted here", and while those major players have discovered the financial value in having offices in Asia, the creative direction is usually still determined in the States. As Shannon Wiggins, manager, placement and alumni relations at Gnomon School (**www.gnomonschool.com**) puts it: "Los Angeles has always been – both currently and in the past – at the heart of the VFX industry." It's not just true for VFX. "America also has opportunities in various aspects of 3D that other countries may not offer", explains Goulden, "while I focus on games, there are also opportunities for film, print and illustration."

VFX house Pixomondo (**www.pixomondo.com**) has built up a network of studios across the globe. John Parenteau explains: "Because of the proximity to Hollywood, the Santa Monica studio tends to be the lead house on a lot of feature films including *The Amazing Spider-Man*, *Snow White and the Huntsman* and *Hugo*, for which Pixomondo artists won the Academy Award for Best Visual Effects. We also handle commercials and motion graphics work."

> "Los Angeles has always been – both currently and in the past – at the heart of the VFX industry"

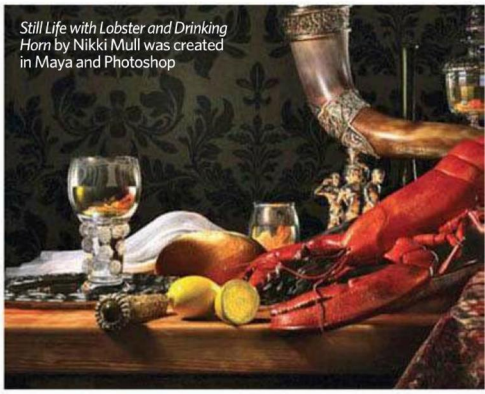
It's not just winning awards that makes the LA studios such an exciting place to be. The chances are they're at the forefront of technical innovation, too. Pixomondo was established in LA in 2008, "right when good 3D was starting to get major technical muscle behind it with the success of films like *Avatar*. 3D technology has moved towards being more of a narrative device and less of a gimmick. Stereo production is very common now so the community has grown to reflect that," says Parenteau.

People who train in LA tend to stay and work there, or that's what Wiggins has found: "The majority of Gnomon students do start out their careers locally in the Los Angeles area, both for internships and also mid-level entry positions. We have a strong network of companies that we work with, not only in California and the US, but also abroad." The bulk of the school's instructors are working professionals, which gives the school solid industry links as well as ensuring what is taught is completely up to date. Wiggins lists Industrial Light & Magic, Weta Digital, Pixar and LucasArts as some of the companies recent graduates have gone to, noting: "As of this past year, we have maintained a 97% placement rate!"

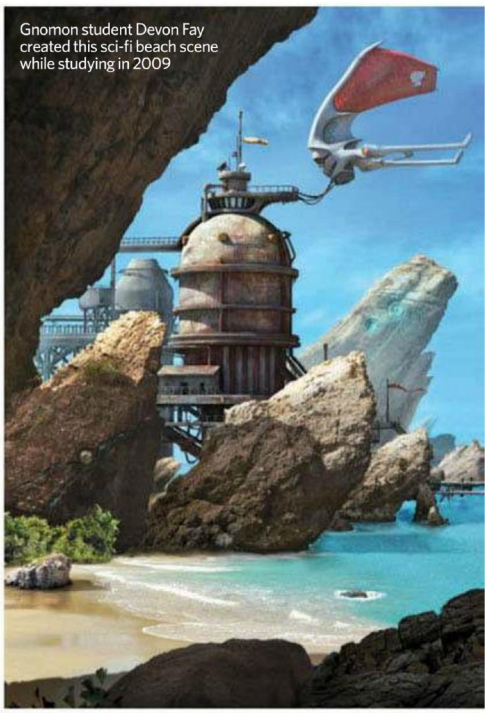
BOSTON

If there's just too much sunshine and jogging in LA, this east-coast city has a lot to offer. Gavin Goulden left Capcom

C



Still Life with Lobster and Drinking Horn by Nikki Mull was created in Maya and Photoshop



Gnomon student Devon Fay created this sci-fi beach scene while studying in 2009

D

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Image courtesy of Pixomondo

Image courtesy of Gnomon

Image courtesy of Gnomon

Image courtesy of Gnomon

E ©Gavin Goulden

Image courtesy of Not To Scale

This still from the trailer for 3D film *La Detente*. The feature took over four years to make

and Vancouver in 2009 to move to Irrational Games in Boston. It wasn't an easy process, given that he had to move 6,000km and get a work visa, but he thinks it was worth it: "I do feel like the majority of artists I know either in person or from following online are American or in America." Boston isn't the most obvious location but, as Goulden explains, this has its pros: "In Boston, a city that has fewer studios, I feel that people stick together longer and represent their team a little more." He mainly uses 3ds Max, ZBrush and Photoshop. However, though he likes his "programs of choice, having experience in the others makes for a better understanding of what's possible – I find. It also helps you avoid becoming a fanboy as you can see the strengths and weaknesses in the different applications."

UK
LONDON

In the words of modeller Max Vogt: "You can find all the big-shot studios down in Soho." Not To Scale's (**www.nottoscale.tv**) production manager Kelly Ford similarly notes: "London is a recognised powerhouse for 3D work."

While London has long had its finger on the 3D pulse, according to Mark Cass, UK general manager of Escape Studios (**www.escapestudios.co.uk**), it has *Harry Potter* to thank for its current strength: "Seeing the visual effects community grow over the past decade has been amazing, and the birth of *Potter* in the UK has accelerated [this] exponentially and has been well documented." The training company, which has more than 2,000 Escapees working all around the world, is set to run the UK's first Visual Effects Festival this year, "to build this community even further," he adds.

Vogt joined the Soho community – a veritable urban village in the heart of London – from Hamburg, where he worked as a 3D generalist freelancer in commercials. He then attended the Vancouver Film School (VFS), and it was there he came first in his year and won an internship at Framestore, London. When he first started the company provided accommodation for all the interns: "We all lived together in those two months and had a great time. If you are going for an after-work beer with your workmates you are meeting a lot of other VFX artists in the pubs nearby the VFX shops." Max has carried on working for Framestore, including on *World War Z* and *Gravity*.

Though the very biggest films are produced in London, the UK doesn't (yet) have an animation house to rival Pixar or DreamWorks. "Where London differs from the US," explains Cass, "is that we are not well-known for fully animated CG films yet. Only *Valiant* (2005) and the *The Tale of Despereaux* (2008) have really been completed in the UK." Many Escapees go to work in Soho, as Cass explains: "Others

A look to the future...

Although hot spots like LA and London are always going to be hot, the future is going to see even more work migrating beyond them. New locations in Asia will spring up, and more and more cities in North America will develop industries.

In the UK, Bournemouth – which already has a sterling reputation for teaching 3D students their trade – is increasingly going to become a location to work too. The National Centre for Animation (NCCA) is in the process of setting up an International VFX Hub, which postgraduate framework leader Sofronis Efstathiou explains, "will deliver a number of projects over the next four years", including "a commercial animation studio, an international competition and festival, an artist-in-residence scheme, short courses and PhD funding."

The NCCA already has excellent links with the industry, but part of the aim of the hub is to smooth the progress of students from education into industry.

Framestore set up an outpost in Bournemouth recently and as Efstathiou points out, the town has a lot going for it: "It offers a lower cost of living, excellent nightlife, access to the beach... and is currently the fastest-growing business startup capital in the UK. In April this year alone, 132 new startup companies were registered, bucking the national trend," says Efstathiou.

> "Seeing the visual effects community grow over the past decade has been amazing"

Image courtesy of Not To Scale

London animation studio Not To Scale uses Softimage as its main software package. This still from *The Lab* shows the work of one of the studio's directors

C In this shot by Pixomondo for Martin Scorsese's *Hugo*, the platform is there, but the rest of the stations are created digitally

D This render of a 1956 Chevy Bel Air was created by Jay Machado for a class at Gnomon on hard-surface modelling

E *Bishop* was created by Gavin Goulden for the CG art comp Dominance War and it was also printed as a poster

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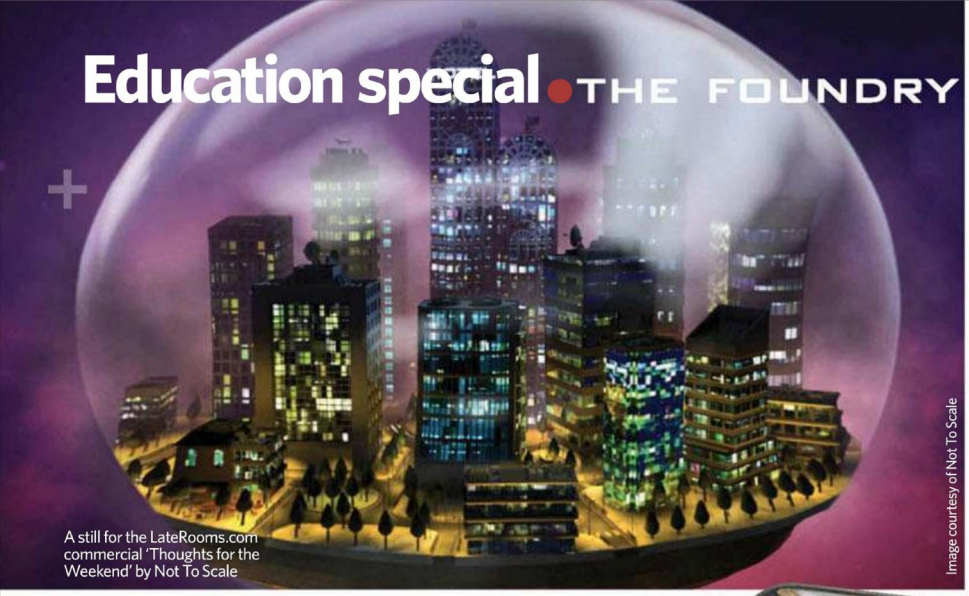

A still for the LateRooms.com commercial 'Thoughts for the Weekend' by Not To Scale

Image courtesy of Not To Scale

©Max Vogt

©Dan Lupton

Image courtesy of Vancouver Film School

Image courtesy of Not To Scale

This radio was created by Peter Day, a VFX artist who trained with Escape Studios

Image courtesy of Escape Studios, by Peter Day

Where to find jobs

Don't wait until you've graduated and then have a nice summer off to try and find a job. Doing it while you're still studying gives you momentum, as well as access to all the university's industry contacts. Marianne O'Reilly, head of animation and visual effects at Vancouver Film School (VFS), explains that the majority of their grads, "do land their first job here in Vancouver, but organisations from all over the world have been recruiting our alumni for a very long time. Since 2011, VFS grads have gone on to join Rainmaker, Digital Domain, Sony, BioWare and The Mill to name a few, and have gone to work in countries from the US to Italy to Chile."

The nature of the game means that, "the workforce in Soho is a very fluid one, made up of many freelancers working from company to company, job to job, so it certainly provides a lot of variety," explains Mark Cass from Escape Studios. "We have an in-house recruitment department which is really well respected within the industry, placing students that have finished a course with us as well as general freelancers."

Of course, if you're freelance, then you may well find yourself looking for new contacts pretty regularly – or at least keeping up with what's out there. Sites like **http://jobs.cgsociety.org**, **http://cghub.com/jobs**, **www.behance.net/joblist** and **www.animationbase.com** are all great, plus **www.gamesindustry.biz/jobs** for jobs in games and **http://jobs.cgarchitect.com** for arch-vis work. Don't forget, you can always contact your dream companies direct.

> "Soho is such a hub and it's where the majority of the European work is carried out"

want to go and work for one of the majors in the US. Generally not before they have earned their stripes in the UK, though! And, of course, our students come from all over, because Soho is such a hub and it's where the majority of the European work is carried out, we have a large number of students coming from Italy, Portugal and Spain, for example. They want to study where the work is."

Animation studio Not To Scale, specialising in commercials and motion graphics for broadcast, regularly takes on graduate interns, watching Supinfocom, National Centre for Computer Animation (NCCA), Escape Studios, Gobelins and London College of Communication closely for up-and-coming talent. Sofronis Efstathiou, postgraduate framework leader for the NCCA at Bournemouth University, explains: "Around 60 per cent of NCCA graduates work on film, TV and commercials, gravitating towards Soho. Games studios are found across the country, meaning some graduates move further afield. However, those who work in Soho love it. It's vibrant, interesting and with plenty of work."

NCCA and Escape Studios are dedicated to keeping in touch with the industry, meaning the right techniques and programs are always taught and the students get the most relevant tuition possible. As Cass puts it: "When our students leave us, they know exactly what the industry is going to expect of them."

GLASGOW

Of all the 3D opportunities across the UK, Glasgow has particular potential. While there aren't really any of the biggest players in Scotland, Glasgow has names like 422.tv and Firebrand Games, as well as a wealth of smaller studios. There's the Digital Design Studio at Glasgow School of Art, which runs both undergraduate and postgraduate courses, and Glasgow Caledonian University has a BA in 3D Computer Animation. There's also the City of Glasgow School of Art, which has a strong line in HNDs for the creative industries.

F Work in progress for the first LateRooms.com commercial by Not To Scale 'Bubbles,' directed by Ubik

G Max Vogt created this Avalon character concept sculpt in December of 2011 for his personal portfolio

H This is a work-in-progress image from a CryENGINE mod Dan Lupton is working on called *Sandstorm*

I *Forest Guardian* is by the Vancouver Film School graduate Stephanie Pocklington for her demo reel

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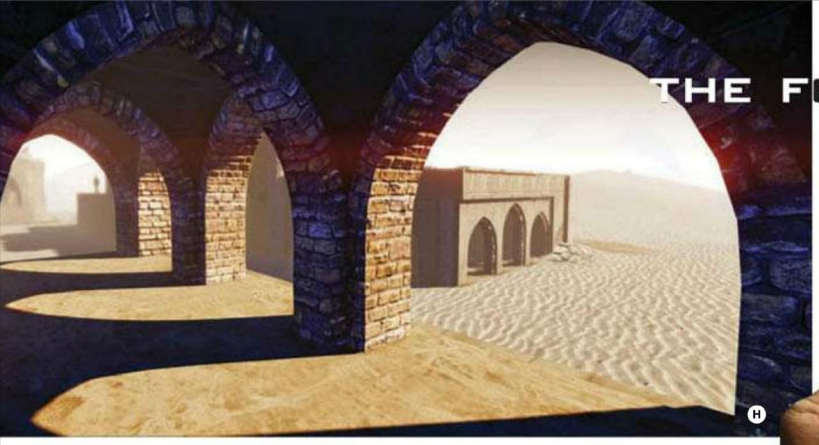

Gentlemen is the name of this model, created by VFS student Amelie Zunk

Image courtesy of Vancouver Film School

Image courtesy of Vancouver Film School

VFS student Leonardo Bonisolli created this animation called 'Drink Drunk'

CANADA
VANCOUVER

Sometimes referred to as Hollywood North, the Canadian film industry has bloomed and blossomed incredibly in the last few decades. There are several reasons for this – Vancouver can be most American cities, Toronto can just about pass as New York, Vancouver is in the LA time zone – but money is most important. There are tax incentives to shooting north of the border, and if you're shooting there, why not do the VFX too?

Marianne O'Reilly, head of animation and visual effects at VFS has seen Vancouver become a 3D hot spot: "The demand [for VFS's animation courses] increased gradually over a ten-year period, then really started to take off as the industry expanded locally and internationally for digital production artists servicing studio tent-pole films." She identifies a big turning point for the city being when, "Rainmaker Visual Effects worked on the Saint-Sulpice sequence in *The Da Vinci Code*. Digital environments continued to become more popular in Vancouver, including the addition of digital crowds. Over the past several years, facilities such as Image Engine and Moving Picture Company were able to take creature animation to the next level in Vancouver."

According to O'Reilly, there are plenty of opportunities for graduates in Vancouver right now: "We're fortunate to be experiencing a boom in Vancouver with many studios expanding or opening up shop, like Digital Domain, Image Engine, Pixar Canada and many others." But being such a well-known hot spot does have its downside. For games artist Dan Lupton, supply is exceeding demand with, "fierce competition happening for almost every game art job in the area. There seems to be more of a demand for lead artists in Vancouver than mid-level guys without a lot of leadership skills. That's what I've personally found lately."

> "Vancouver's indie game developers are going to make some amazing titles"

Nevertheless, there is undeniably a community feel to the 3D industry in Vancouver. As Lupton (who has worked for Electronic Arts and United Front Games) explains: "Many of the game studios that exist in Vancouver today were originally spin-offs from Distinctive Software, Inc... After about five years of working in the area, you get a pretty good sense of just how tightly woven the ties are between people in the industry." Gavin Goulden, who made the move from Vancouver to Boston agrees, with his assessment of the Vancouver scene: "People jumped from company to company, and even from films to games quite a bit. Because of that, I think people were generally more connected or knew a guy in practically every single company."

According to O'Reilly, 78 per cent of VFS's 2011 graduates have stayed in Vancouver, while others, "are working in Europe, the USA, India and elsewhere." Looking at the same pool, 84 per cent went on to work in film or TV production, with others going into industries like games and advertising. From Lupton's perspective, it's the gaming side of Vancouver that is going to boom next, specifically the indie game scene. They, "have so much more creative freedom than a studio backed by a giant publisher because they answer to nobody," says Lupton. "I have no doubt that Vancouver's indie game developers are going to make some amazing titles over the next few years because these people do it for the love of making fun games. This is where the passion, the drive and the growth is right now."

MONTREAL

Vancouver isn't your only choice in Canada; Montreal has a lot to offer the fresh graduate too. While Toronto has plenty of big companies, why does Montreal pip it to the post? One word: Autodesk. When the software company behind a large number of the industry-standard packages based its media and entertainment division there, it certainly helped a hub grow. It also gives it a slightly different vibe, a place where software engineers can mingle with CG artists. On the games side things are strong, too, with Square Enix opening a new studio this year. Canada is a great place for a 3D artist to work, but it is competitive. "I don't think it's possible to differentiate Canadian work from any other country," says Dan Lupton. "The quality of art that comes out of Canada is just as amazing as the stuff that comes out of Hollywood."

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Working abroad

Freelancing is hard enough in your own home town, but when you're trying to build a career in a unknown city it's harder still. How resilient you are, how pushy or proactive you can be will all be put to the test. There are still some full-time jobs to be had, and a job offer is necessary if you're going to get a work visa for the United States.

Gavin Goulden was working at Capcom in Vancouver when a friend recommended him for a job on *BioShock Infinite* at Irrational Games in Boston: "I loved what I saw and was really interested in working with the team", and the process included "an art test, multiple interviews [and] obtaining a work visa", he adds. "There are no financial incentives to working in America," Gavin continues. "Really there are tons of people employed to turn people like me away from working here. To prepare for this encounter, it took longer than expected and there [were] a lot of unknowns until the moment I had the visa in my hand. That being said, my personal experience wasn't painful at all, it was just stressful."

Sofronis Efstathiou from Bournemouth's NCCA notes that while "working in the games or film industry requires a similar skill set no matter where you go, working abroad will mean a visible level of competency must be displayed. Undergraduate and postgraduate qualifications are also important – especially as visa applications are taken into account. In a global industry, being as mobile as possible is an advantage. Students who work abroad are expected to be culturally savvy and sensitive when working in a foreign country."

Image courtesy of Universal Pictures

Double Negative's Singapore branch worked on the cult hit *Kick Ass*

Image courtesy of LASALLE

Image courtesy of LASALLE

J Kevin Lumoindong used Maya, Photoshop, After Effects and Premiere to create his second-year piece at LASALLE

K Abdul Hafiz Bin Ramli used Maya, Photoshop, After Effects and Premiere on his short film 'Bajau'

ASIA

SINGAPORE

Some 3D hot spots are born and others are made. Singapore is of the latter variety. About ten years ago, "the Singapore Government set out a plan to develop Singapore into a global media city, where media services and projects are created, developed, traded and distributed to an international market," explains Chris Shaw, programme leader of animation art for LASALLE College of the Arts. This was followed by the establishment of university courses to back up the burgeoning industry. In short, "there is and was tremendous support by the Singapore Government for the development of an animation industry," says Shaw.

> "The Singapore Government set out a plan to develop Singapore into a global media city"

VFX house Double Negative set up its Singapore studio in 2009. "We specialise in tent-pole Hollywood movies, but also look to support independent filmmakers and local talent in the region," says creative director Nathan McGuinness. While Shaw explains: "Initially a considerable amount of work was outsourced to Singapore, with creative decisions made elsewhere", though this situation is slowly changing. He says there have been, "some brave and encouraging attempts at developing and producing animated films in Singapore – Infinite Frameworks is at the forefront of this development with titles *Sing to the Dawn* and *Tatsumi*", and LASALLE sees part of its mission to, "educate the next generation of animators by encouraging risk taking."

As McGuinness says, the skill base in Singapore is, "on a par with anywhere else in the world. We always like to add different talents into the mix and those with local skills in gaming, anime and art... all bring something fresh and exciting to the table." Shaw agrees, pointing out "Singapore is positioned geographically, economically and culturally to clearly benefit from Eastern and Western influences. Asian culture is filled with a plethora of stories and a wide range of approaches to storytelling. However, competing with Japanese, European and American studios is intimidating. It is well documented [that] the animation industries in all these countries went through their own development and established very different styles... and aesthetics."

Image courtesy of LASALLE

Shaw explains that work in the area was originally started in 3ds Max, however, "as the large film studios and production houses established themselves here there was a migration to Maya. Consequently the training and education institutes switched too," he adds. All of this means that talented CG artists in Asia don't need to look for work so far from home, but equally they're trained to do so if they want to. McGuinness says they are, "proud to be working to build a VFX community in the region."

SHANGHAI

Moving from Made in China to Created in China, the People's Republic is working hard. The world's largest city by population, Shanghai is certainly busy and bustling and has long had a big gaming presence, with Ubisoft located there. Now the VFX market is calling it home too, with Smoke & Mirrors and Pixomondo nabbing a Shanghai address. Pixomondo's John Parenteau explains that: "Where a project is based is generally determined by the location of the production, if more than one facility is needed, the lead facility will divide up work depending on the strengths of artists and the availability of our facilities. We also tap our standardised VFX workflow to address any shot changes quickly and efficiently. For example, a supervisor could provide VFX direction from LA, hand off CG elements to Shanghai to pass along to the VFX team in the UK and have it back for approval in LA by the next morning!"

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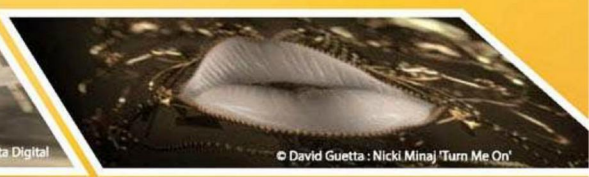
GET NOTICED IN VFX

WITH A LITTLE HELP FROM THE FOUNDRY



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JOIN THE VISUAL EFFECTS REVOLUTION

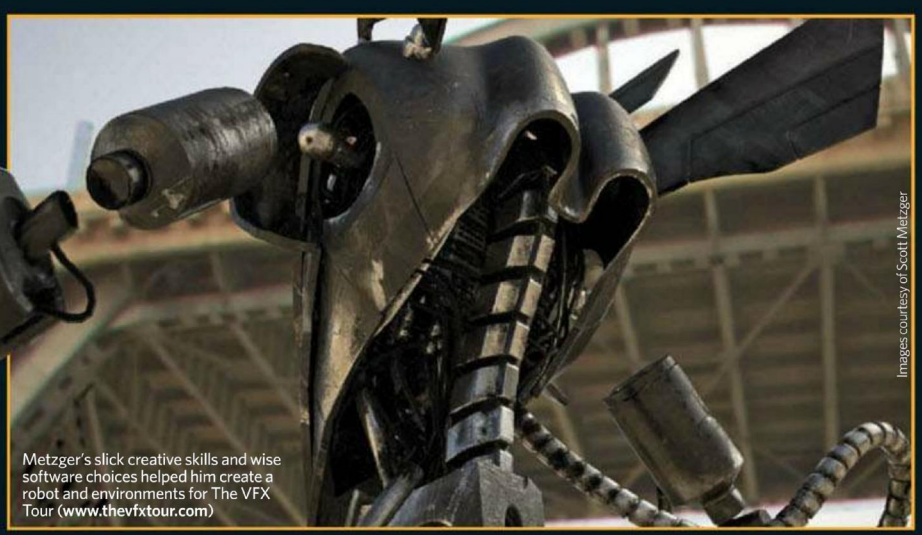
The Foundry's groundbreaking software solutions for VFX compositing and digital painting are now available with a student-friendly price tag

With a range of award-winning products for heavy-duty visual effects, The Foundry's software is renowned by VFX facilities and artists the world over. The company's solutions are used extensively by the likes of ILM, Walt Disney Animation Studios, Weta Digital and Sony Pictures Imageworks. These and more impressive names all vouch for the company's inspiring product design and collaborative culture in the 3D industry and beyond.

Among The Foundry's top products are NUKE and MARI, both of which started out in the trenches of VFX production. While NUKE is the compositing tool of choice for those working in visual effects, its origins began in Digital Domain. MARI started life at Weta Digital as a revolutionary 3D paint system. The Foundry's devotion to the technology made these solutions available for the masses. These tools are now the de facto choice for global VFX artists.

THE FOUNDRY

Scott Metzger made extensive use of The Foundry's MARI and NUKE on the David Guetta/Nicki Minaj music video for *Turn Me On* at COPA



Images courtesy of Scott Metzger

Metzger's slick creative skills and wise software choices helped him create a robot and environments for The VFX Tour (**www.thevfxtour.com**)

ARTIST SPOTLIGHT
SCOTT METZGER

HARD AT WORK

With 12 years in the industry under his belt, digital effects supervisor Scott Metzger is currently working on production of the feature film *Beautiful Creatures* at Alcon Entertainment. His impressive resumé lists a host of top studios including Digital Domain, Method Studios, Zoic, MetroLight Studios, NTROPIC, Eight VFX, Moving Pixels and COPA.

©2011 Disney Enterprises, Inc. Images courtesy Double Negative Visual Effects

MAKING THE BREAK

Metzger's got a pretty straight-up attitude to the industry and how it should be approached. "It goes like this," he says, "you have to be more interested in having fun than making money. Everyone starts somewhere. You work hard and get better every day... in the end, self-determination and passion for what you love will allow you to make any dream a reality."

THE ROAD TO SUCCESS

Before embarking on his professional career, Metzger was a 3D hobbyist working with TrueSpace in his bedroom. He reminisces: "Countless hours were spent watching renders draw up on my screen pixel by pixel." But things have changed a lot. His skills are now much slicker – as are the software packages he uses.

AN ARTIST'S TOOLKIT

MARI is Metzger's high-end digital paint tool, with NUKE his compositing package. He believes MARI has the edge over others: "It's perfect for me because it gives me unlimited freedom as an artist. I never have to worry about limitations, I just freely paint whatever I need and the software conforms and flows in an intuitive manner."

EDUCATING ARTISTIC SPIRIT

While school is a great environment to learn the fundamentals, "developing core skills in the software that is actually used in the real world will stand you in good stead," Metzger says. "But the learning really starts when you get your first job... Art is a passion that comes from love, you need to put the time in to achieve your dreams and stand out from the crowd."

STUDENT BENEFITS

Metzger thinks The Foundry's educational software bundle is pretty awesome. "It's a ridiculous deal!" he announces. "There's really no excuse to not have MARI, NUKE and HIERO littered all over the place. Those licences are yours for the duration of your course, providing you the freedom to work outside of your classroom on further learning and creative projects."

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> Get more than 95 per cent off prices with The Foundry's Education Bundle. Find out more: www.thefoundry.co.uk/education

ARTIST SPOTLIGHT

ALWYN HUNT

THE TRAVELLING ARTIST

This senior texture artist on *The Hobbit* at Weta Digital, began his VFX career in Sydney, working on commercials. Over seven years he's travelled the world to wherever the next feature film takes him, ticking the Double Negative, MPC, Sony Pictures Imageworks and Animal Logic boxes along the way.

A PASSION FOR ART

It all started with traditional studies. His passion for art led him into photography and Photoshop, before an advanced diploma in Computer Graphics turned his hobby into a viable career "just in time for 3D animation to really take off in Australia," he says.

THE FOOT IN THE DOOR

Upon graduation, Hunt hit the phones – and it worked! With a foot in the door, his rollercoaster ride to success began. Armed with a range of artistic experience he tried his hand at most tools, before settling on MARI for paint and NUKE for compositing.

LEARNING ON THE JOB

Hunt learnt MARI on the job with the help of some excellent training videos from The Foundry's website and the other talented artists at Double Negative. In his opinion, MARI is an excellent painting tool. "It's fast and responsive and lets me concentrate on being an artist, removing the wasted time I once spent managing files," he says.

THE POWER OF KNOWLEDGE

"There isn't a lot of training that goes on once you land your first job, so making sure you're learning the right industry tools is extremely important," Hunt says. "You'll be able to hit the ground running and that'll give you the edge you need to find the perfect job."

ADVICE FOR ASPIRING ARTISTS

Hunt has a few words of advice for VFX artists looking to get on the ladder: "The Foundry's Student Stars Channel is a great place to showcase your work, with real potential of being seen by industry professionals." He continues: "Stay informed, specialise, know the industry, make sure your reel is relevant. If you do nothing else, do one or two things really, really well, rather than ten that are average!"

NUKE BY THE FOUNDRY

NUKE & NUKEX

WHAT DOES IT DO? NUKE is The Foundry's original compositing tool, while NUKEX takes the power of NUKE – its arsenal of tools – and extends it, making workflow even more efficient.

WHO'S USING IT? NUKE is the industry-standard Swiss army knife for film, commercials and episodic TV. It's been battle-tested on the most ambitious visual effects projects ever attempted yet!

WHERE ARE THE KEY HOT SPOTS OF NUKE ACTIVITY? NUKE has a global footprint with the most established markets being the West Coast US, Europe and Australasia, however emerging markets, such as in Latin America, are quickly catching up.

For more information on NUKE and to download a free 15-day trial visit:
www.thefoundry.co.uk/nuke

MARI BY THE FOUNDRY

MARI

WHAT DOES IT DO? MARI is the 3D digital paint tool that has revolutionised workflow for VFX painting artists everywhere, taking care of the tech to let artists paint freely.

WHO'S USING IT? MARI is used worldwide on a range of film and commercial projects. It's praised by studios including Sony Pictures Imageworks, Mr. X, Baseblack and Framestore.

WHERE ARE THE KEY HOT SPOTS OF MARI ACTIVITY? MARI is also an international tool with the greatest concentration of use in West and East Coast US, Europe, India, Japan and Australasia.

For more information on MARI and to download a free 15-day trial visit:
www.thefoundry.co.uk/mari

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ULTIMATE 3D REALISM

Fool the eye and wow your viewers with our top tips from industry pros on how to achieve realistic 3D images

Realism is often the ultimate goal of the 3D artist; to render something as close to life as possible and showcase your individual talent as well as the power and potential of CGI software. Here we compile a selection of tips from pro 3D artists to help you create your most realistic images ever.

On the Disc

HDR image maps and photorealistic models courtesy of CGAxis

50 TIPS FOR PERFECT 3D PHOTOREALISM

Eldorado. "At the beginning I wasn't really sure what would be the hero of the shot. I was thinking about a tennis ball, golf ball, pack of cigarettes, bottles and so on, but in the end one little toy car won"
© Marek Denko

> Good textures and materials make the model more expressive, bad ones destroy even the most gorgeous geometry
>
> **Dmitriy Glazyrin**

MODEL FROM REFERENCES

Get your project off to the best start during this crucial stage

01 It´s extremely important to have a lot of references and I... request constant references (from photos to real objects) whenever a new job or update arrives in the office. **Jacinto**

02 The best criteria [when sourcing references] is the resolution of photos. It is very important to see the details of an object in the photo... that way you don't waste your time trying to understand it. **Denis L**

03 Not using references may not give you enough information about the scale of the objects in your scene... In my opinion scale is the most important aspect of creating realistic images. **Denis O**

04 I like to have at least one side view and a three-quarter view. Even better would be if you had access to the real objects themselves, to either take pictures of or have next to you while modelling. **Emre**

05 It's a matter of finding the right balance between a low and high-poly mesh [initially]. For the basic model I use Maya, then I switch to Mudbox for the details and normal maps. I try to keep the mesh topology flawless based on quads and loops. **Massimo**

Words: **Hannah Phillips**

ARTIST PROFILE

Marek Denko
Website: www.marekdenko.net
Bio: Marek fell in love with computers in 1991 with his first Atari 800XL. In 2007, together with Peter Sanitra, he established the creative studio NoEmotion (**http://noemotion.net**).

Dmitriy Glazyrin
Website: www.glazyrin.com
Bio: One of the founders of Ujean & Glazyrin studio, Dmitriy has worked with a range of creatives, including retouching studio Platinum FMD, and has obtained a series of awards.

Denis Lebedev
Website: http://lebedev.cgsociety.org/gallery
Bio: After forgetting his childhood passion for drawing for many years, Denis returned to the art world and began exploring the many possibilities of 3D art in 2009.

Jacinto Monteiro
Website: www.metrocubicodigital.com
Bio: Jacinto graduated as an architect in 2002. In 2007 he radically switched profession and has now been a 3D arch-vis artist for five years.

Denis Osmanbegovic
Website: vema3dart.blogspot.com
Bio: Currently working at Cryptic Studios in California, Denis is an environment artist for videogame projects including *Star Trek Online* and *Neverwinter Nights*.

Pawel Podwojewski
Website: www.motyw.com
Bio: Pawel has been involved in the development of designs and concepts in the field of architecture for various industries. In 2009 he started CG WORKSHOP online.

Massimo Righi
Website: http://massimorighi.com
Bio: Massimo is a freelance 3D artist based in Italy, often working in collaboration with his wife Silvia Puliè. They are often involved in various projects within the games and film industries.

Emre Salihov
Website: www.be.net/emresalihov
Bio: Emre is a 22-year-old artist from Sweden. As a child his favourite toys to play with were LEGO cars. He claims he found his calling in life when Autodesk's Maya fell into his hands.

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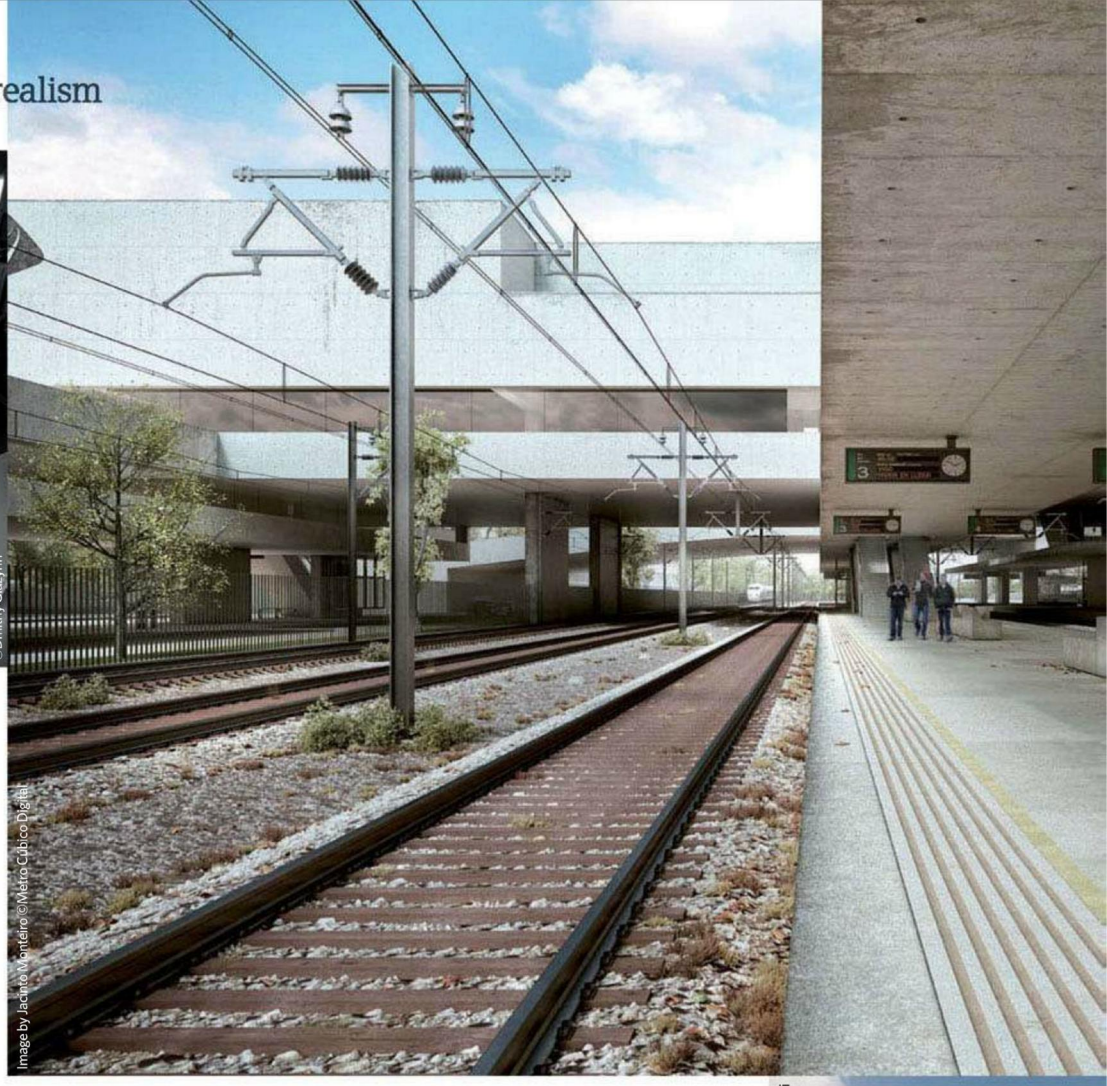


Image by Jacinto Monteiro © Metro Cúbico Digital

TEXTURES AND MATERIALS

Choose and apply effects to your models for the greatest realism

06 Textures and materials are a very important stage in creating realism in work, [and] probably the longest one... Good textures and materials make the model more expressive, bad ones destroy even the most gorgeous geometry. **Dmitriy**

07 There are two main types of textures: custom-made... and tileable textures. Perfect texture should have a good resolution, good colour depth and details... based on the purpose of the texture in the scene. **Marek**

08 I try to custom texture everything... [using] a lot of different custom brushes in Photoshop allows me to do this. This doesn't mean I don't use textures I find on the internet, but I do use them carefully. **Denis O**

09 For [texturing] hard-surface objects, I use 3ds Max and Photoshop and for organic, ZBrush and Photoshop. In any case, Photoshop is an indispensable tool for creating textures, both at the stage of texturing and [post work]. **Dmitriy**

10 Creating a simple light setup before you start texturing is a very good idea... I always have one key light where my main light source is and then, depending on the model, one or two rim lights and also one fill light that doesn't cast any specular. **Emre**

11 The textures used to light a scene should be saved as high dynamic range images (HDRI). This allows you to control the exposure and luminance at any stage while rendering. **Pawel**

12 The [most] useful texture maps are Color, Specular, Bump and Normal... [though if you are texturing] fur, sometimes you don't need to create normal maps or you only need to create them for the visible mesh. **Massimo**

PRODUCE EXPERT LIGHTING

From rigs to shaders, lighting is vital for realism

13 Lighting will get your project 80 per cent of the way there... with some experience you will understand more or less what you can fake later on... [but] don't worry about the richness and contrast of the colours. It is easier to crunch them in post with colour correction. **Emre**

14 I tend to keep lighting as simple as possible... It is really important to study your renderer of choice and how it relates to your main program (3ds Max, Softimage, Maya and so on) and understand its potential. **Denis O**

16 The right lighting shows all the small details you've modelled... [so] it is useful to use images (pictures and photos) where you can see beautiful lighting, to analyse it and take note of it. **Denis L**

17 It's important to build shaders and lighting in an organised way. Make sure the same group of lights will be instanced so you can easily adjust all of the lights at [once]. Shaders should be built with a colour-correction plug-in used for textures. In most cases this will enable you to adjust the shaders without 2D texture editing. **Pawel**

15 The best lighting software

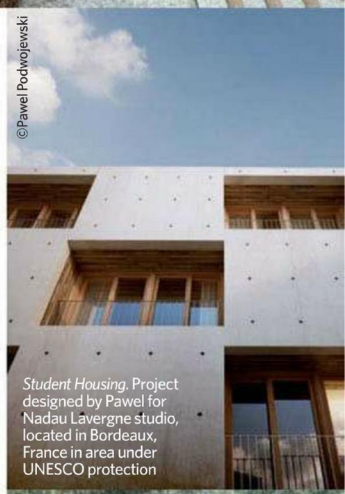
A rundown of the experts' choice for the perfect setup

[V-Ray] is a quick renderer with easy-to-use tools. You have a virtual camera, which has the same options as a real one. Sometimes I check the settings of the camera on the reference images (you can check it in Image Properties) to get an idea about physical conditions and [then] apply them to the VRayPhysicalCamera. **Dmitriy**

If you are doing one-man projects and want quick, accurate and good results, then V-Ray is what I would choose. I like mental ray as well but it requires lots more preparation and clicking of buttons to achieve what you want. **Emre**

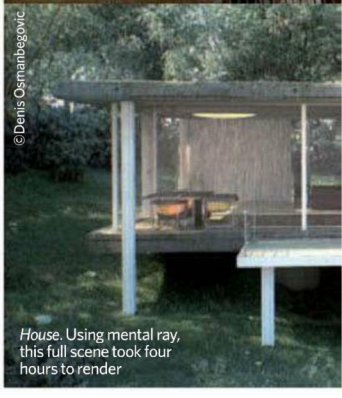
I prefer to light in 3ds Max and mental ray. mental ray is a really powerful renderer with some pretty easy-to-tweak options. Also, 3ds Max comes with a pack of arch and design materials for mental ray with a couple of presets that are easy to change. **Denis O**

V-Ray is the best. Sometimes I use HDR images, other times the VRaySky method, sometimes just a semi-sphere for the sky with only a sphere light. **Jacinto**



©Pawel Podwojewski

Student Housing. Project designed by Pawel for Nadau Lavergne studio, located in Bordeaux, France in area under UNESCO protection



©Denis Osmanbegovic

House. Using mental ray, this full scene took four hours to render

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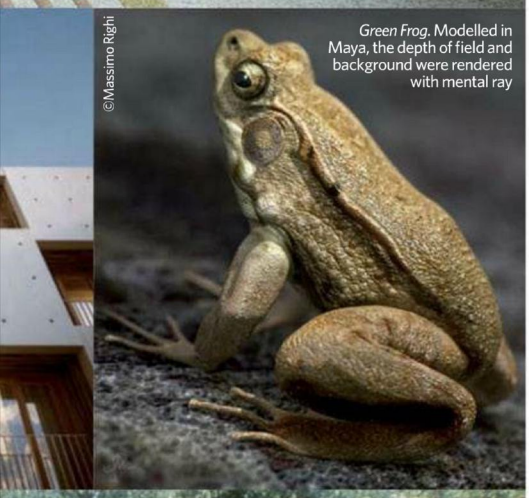
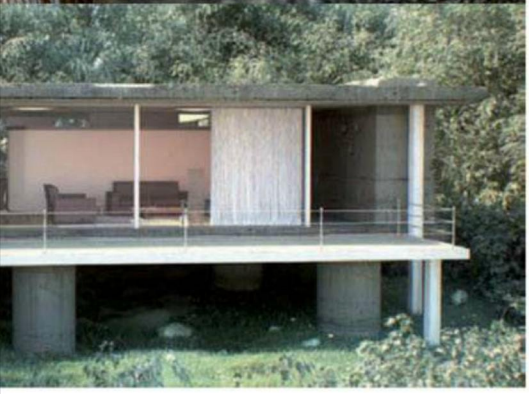
TGV Station. This architectural project is located in Ourense and includes a TGV station, hotel and an office block surrounding all these buildings



©Massimo Righi

Green Frog. Modelled in Maya, the depth of field and background were rendered with mental ray



18 Studio lighting and lighting environments is very different... To simplify the environment modelling you can make low-poly objects, or simplify the plane to stretch the texture of the mask. Creating the environment in layers means the lighting will work properly with different angles and camera lenses. **Dmitriy**

19 Sometimes I use HDR images to light my scene. If the HDR image is a good one, the lighting just looks incredible (and more credible). Colours and reflections are rich and you also have more freedom in post to tune the image based on those colours. **Marek**

20 For my main [lighting] I don't use HDR images so often because it's difficult to handle that type of light source with fur, but I [sometimes] use it in render passes to get realistic-coloured reflections. **Massimo**

21 CGSkies (**www.cgskies.com**) and Peter Guthrie's HDRI lighting setups have made the 3D community very happy lately, and each day more and more artists are using it in their normal workflow. **Jacinto**

KNOW YOUR RENDER PASSES

It's easy to believe you're done once you've rendered out, but the fun's just starting

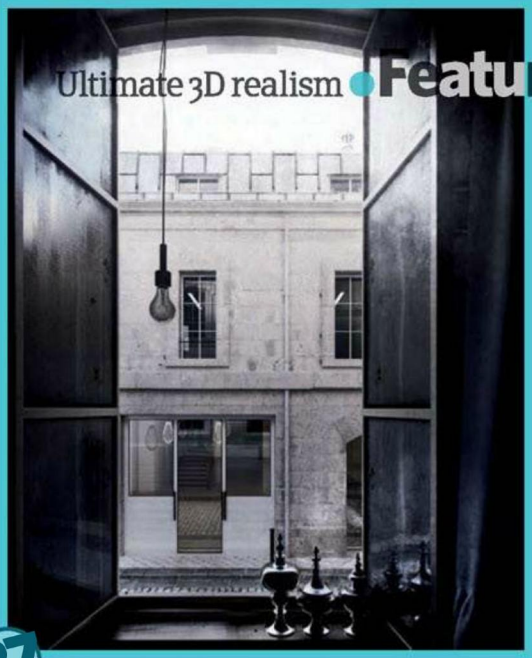
22 Render elements are very useful and save a lot of time in postproduction, especially when working with animated sequences. With passes you can easily change any elements in your image without re-rendering. **Denis L**

23 You only get [some] of the beauty render straight out of the rendering, the rest comes in when you start to composite it together... with V-Ray it is very easy to render out with passes and you can also render out each light as a separate pass, which can be very useful. **Emre**

24 I would say that V-Ray Z-Depth is the most important pass [for hyperrealism]. It can add better mood, depth and postproduction depth of field to the image... The biggest danger for me would be to go too far... so I avoid doing heavy postproduction. **Jacinto**

25 A solid Beauty pass where I can see my image almost done when I render it is the better way... As extra passes I use Z-Depth, masks, sometimes extra light passes and... when there are effects like smoke or fire, they are always rendered as a separate pass. **Marek**

26 You need to rely on your experience to know if a result is right or wrong. Very common mistakes appear while using Z-Depth [passes]. It is a very handy technique that can save a lot of rendering time [and] such effects may enhance your image... but when applied in the wrong way can also kill the scene. **Pawel**

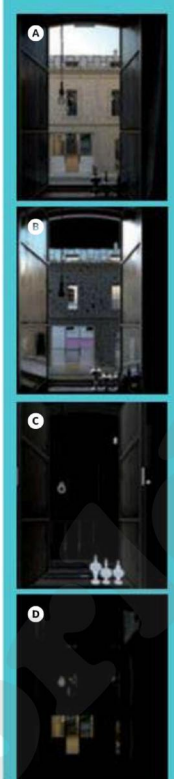


27 Realistic render passes

Learn the process used for this professional project

Pawel produced this image as part of his concept design for a student housing project by architectural studio Nadau Lavergne. In his experience, utilising render passes means you have more scope and flexibility with your image: "During the production you may find the render channels very handy while applying changes or [additional] details to your image." This is particularly useful when working to a client's brief where the needs of the project may dictate such changes.

Pawel takes us through his render passes for this window view, which is especially interesting for its use of filters to get the reflections on glass elements exactly right. He uses psd-manager from Cebas (**www.cebas.com**) to organise his passes, finding it "the fastest way you can imagine... [it] automatically saves your layers into a PSD format [and] additional masks can [then be added] manually while editing the image. I can recommend it for Photoshop lovers."



A Pawel used V-Ray for a range of passes that add detail and atmosphere. "Each pass had the same settings as this RGB render"

B "We added a lot of detail in postproduction compared to the raw render... glass reflections have been controlled using [more] specific passes"

C "We used some channels to add effects and other ones as selection masks. For example, the Reflection filter will be a selection [on the] Raw Reflection pass

D "For reflection and atmospheric passes you can try out the Screen blending mode to quickly key out the black tones"

E The Refraction filter is the colour by which the raw refractions are multiplied

F A handy pass for quick changes, you can alter the colour of reflections and add glows with Wire Color

G "Sometimes it is much faster and easier to add the desired [background] elements in postproduction, but... to speed things up I often use the Z-Depth [pass] to control the DOF"

H An additional clay render of the window scene

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Lighting Ford E Bike. Emre advises using "as few lights a possible... work with one light at the time." NUKE is Emre's compositor of choice

Woodworker. The carpenter was shot on a Canon Mark 2, with the wood chips and car modelled in 3ds Max. The stand was made in ZBrush with final compositing completed in Photoshop

28 I find that using a node-based compositing program such as NUKE [makes bringing render layers together] much easier. I don't do any fancy blending, I just use overs and plusses. Occlusion is a good example. **Emre**

29 The wrong settings for the Z-Depth pass won't allow you to make depth of field... [so] use the Tape tool in the Helpers palette in 3ds Max. [Also] some passes can have rough edges and, in the postproduction stage... will have a bad visible contour. For this it is better to use the Multimatte render element in V-Ray instead of Object ID. **Denis L**

30 It is necessary to establish the real behaviour of the camera as precisely as possible. Set the depth of field, anti-aliasing and choose interesting lens parameters. If you take any picture from the internet it's often possible to get the information about the lens and the parameters, so use this when placing the camera in the scene. **Dmitriy**

THE ART OF COMPOSITING

Seamlessly integrate 3D renders with 2D elements for realistic scenes

31 When I create an environment [for compositing] I usually like to matte-paint it [in Photoshop] using a mixture of photographs and retouching. I must have in mind what everything should look like so I create it based on the [render's] lighting. **Massimo**

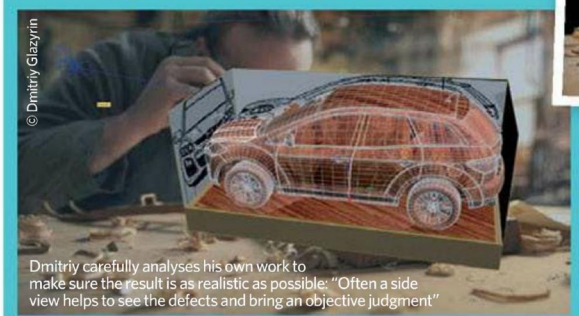
32 Objects that [are] lit in a way that don't match the scene will obviously look fake [so] we [need to] enhance the lighting using different blending modes and paintovers. It is crucial [at this stage] to use colours we find in the final scene for better integration. **Pawel**

33 [When compositing] you can convert the image to a monochrome version. When the colour does not distract you can compare the brightness of shadows and light, the environment and the models, and seek the similarities. Then bring the colour back and get the desired result with the shaders. **Dmitriy**

> "The final touches are to add detail – dust, light rays, flying leaves, sparks and dirt – a variety of small details that fill the picture"
> **Dmitriy Glazyrin**

34 The ideal combination

Dmitriy Glazyrin shares how he went about compositing his incredible image Woodworker



Dmitriy carefully analyses his own work to make sure the result is as realistic as possible: "Often a side view helps to see the defects and bring an objective judgment"

As far as Dmitriy is concerned, the art to seamless compositing requires a few main ingredients: "The key factors are the well-detailed model, the right light and the materials.

"Light sets the mood of the whole picture", he says, and cites it as the deciding factor for embarking on a compositing project. "I use a picture to create the basis for future models or find a reference by the light I like... then you achieve the ideal combination of objects." To achieve this ideal combination, Photoshop is Dmitriy's software of choice. "In handling 2D objects [it is] the clear leader. Some use video compositing software such as After Effects or NUKE, but in my opinion for static [images] it makes no sense and is more complicated [than it has to be].

"Attention to detail, observation and analysis" are key, but Dmitriy advises not to go it alone: "Put a picture of your work online and show your friends", as the more feedback you can get, the closer you will come to the ultimate realistic composite.

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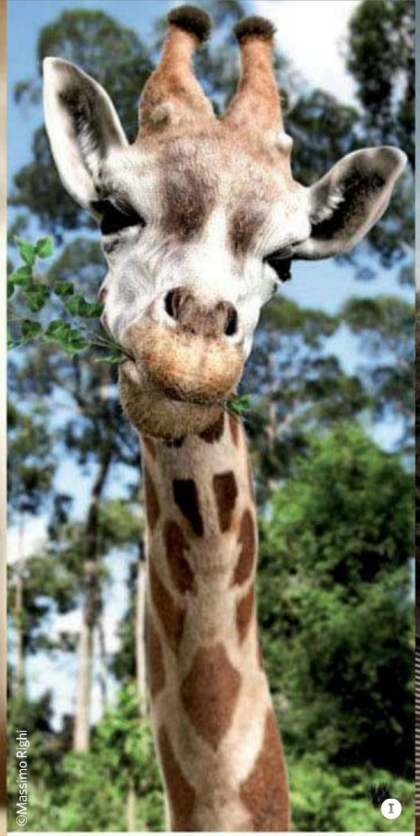
©Massimo Righi

©Denis Lebedev

It's Going to Rain. "I wanted to show an authentic landscape with the post-Soviet realities. I wanted to train myself to a higher level," Denis L says

©Denis Osmanbegovic

PERFECT POSTPRODUCTION

Complete your image with last-minute adjustments for maximum impact

35 The key steps [in the compositing process] would be preparing masks and selections, placing 2D elements in our composition and integrating them with the original image, and finally the colour correction. **Pawel**

36 Matching perspective and colour balance are the most important parts [of compositing]. My advice would be to avoid fish-eye photographs to match your 3D arch-vis work. My experience was a bit frustrating! **Jacinto**

37 The most important thing is [getting] the right perspective and lighting... It is great when you can shoot the objects in a studio because you can apply the virtual camera settings to the real one to obtain a perfect match. **Pawel**

38 Compositing is a matter of taste, [but] my feeling is that if a rendering is looking good without an environment then it's ready to go for compositing. The first test is always getting it right on a neutral background. **Massimo**

39 [For adding photographic characters to CG scenes], having high-res people is important. Then a lot of curves, colour balance, shadow, motion blur and saturation changes should be made in order to make them realistically fit. **Jacinto**

40 Poor composition is unlikely to affect the realism [of a piece]. It may have impact on the overall impression of the picture, but after all, the camera can be bad for the composition of the picture, though [still be] quite realistic! **Dmitriy**

41 Sky is such an important object in the light and material system, [so] try to avoid replacing it [at the compositing stage]. I render skies straight from 3ds Max... for the most realistic results (at least for exterior scenes). **Jacinto**

42 For me ten per cent or less is done in postproduction... I [adjust] Curves, Levels, Color Balance and... it's important because my raw renders always need colour and light correction. **Jacinto**

43 Many artists make their final renders to a very high quality, so often the post work takes about five per cent of the time... It brings some additional control to make your work a little better. **Denis L**

44 Each image – even from the same project – will require a different amount of postproduction work. In my case the average [time dedicated] will be around 20 per cent. **Pawel**

45 About ten per cent of my final [effort] goes into postproduction. I tend not to spend a lot of time adjusting the raw render since I try to get the desired results straight out of mental ray... [but] I think it depends on the artist and the scene itself. Sometimes you can have a final image without any postproduction. **Denis O**

46 You can... get the ideal result by rendering but, on the time side, it [won't] be comparable with working in Photoshop, [which] can correct most of the render and [do it] much faster. **Dmitriy**

47 For postproduction I prefer Photoshop while working with 3D stills and After Effects for animations. These two work well for compositing as well as postproduction. Photoshop can handle huge files and compositions, assuring a quick and stable workflow. **Pawel**

48 The most important thing is colour correction in Photoshop. I use it on the whole image and separate objects using masks. I always work with a copy of the layer and use Levels, Curves, Selective Color and Color Balance adjustments. Before each touch I create a snapshot in the History palette, and then after [I do the same] to compare the result. **Denis L**

49 I think too much postproduction may stylise the image but not necessarily make it more realistic. Some of the real-world effects though, like [adding] image grain or chromatic aberration... can be a nice and quick touch towards a photorealistic image style. **Pawel**

50 Very soft lens distortions may be a good idea to increase the realism. You may think most viewers will not notice this but, believe me, our brains do. It is a perfect situation when you feel something is natural without knowing why! **Pawel**

I *Lunchtime.* As he renders all of his animal characters in Maya, Shave and a Haircut is Massimo's go-to for fur

J *Interior Loft.* An interior that Denis O made to practise an image that seems open but feels "packed with stuff"

K *Student Housing.* A project designed by Pawel for Nadau Lavergne studio, located in Bordeaux, France

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I made this...

Incredible 3D artists take us behind their artwork

Artist info

Sebastien Hue

Website www.shue-digital.com
Country France
Software used Vue, 3ds Max, Photoshop
Bio Sebastien enjoys creating epic backgrounds and environments for viewers to project themselves into

"I used After Effects to generate a realistic sun flare and added it so that it perfectly leads the eye of the viewer towards the focal point of the picture. The contrast is also strengthened with a shadowy foreground on the left to balance light and shade"

Terminal 13 2012

I designed this piece for myself as a true challenge. [It's] inspired by my love of sci-fi movies, [so] it was a purely selfish project. I wanted to create a huge station like you might see in *Star Wars*, or with the notion of massive depth, where you can't even see where the station begins or ends. That is the impact I wanted for this scene. I really wanted to create a massive yet realistic structure. The postwork in Photoshop was particularly essential for me with this image.

"I accentuated the sense of depth and focus by duplicating the very end of the main-right station and blending it in Photoshop, as the 3D calculation in Vue was already quite big for just the first terrain rendering"

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> The station is in fact an entire terrain modelled in Vue. The difficulty was that I couldn't control individual blocks since it's just one procedural terrain. I had to find the right filters and noise node combinations to give interesting shapes to the station

Software used in this piece

Vue | 3ds Max | Photoshop

> To make it more realistic and lively, I put a huge amount of small sci-fi light details here and there in Photoshop, and modelled some elements in 3ds Max – like the small ship deck on the right – to bring a sense of human life and scale

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Create high-end 3D

Adventurer's Diary 2012

> The Adventurer's Diary was made to represent a pirate captain's old notebook containing his stories and travels. It was made to look used and mysterious, luring its reader to uncover its mysteries

Fedde Souverein is the lead CG artist of Souverein's CGI team. He's a lighting and shading expert specialising in mental ray

This tutorial will explain how the *Adventurer's Diary* was created, what choices were made for lighting and shading, and what tricks were used to keep a potentially very complex model as efficient as possible. This guide will explain why texturing was important in this work, and how postproduction helped improve the visuals.

Having already created the 'Written Portraits' series (books shaped in the heads of people like Anne Frank, Vincent van Gogh and Kader Abdolah), Souverein was asked to design a skull-shaped book for **3D Artist**.

To keep it interesting we didn't want it to be an exact copy of the original images, so we decided it would take the form of a handwritten diary. This posed some additional problems compared to the original designs, because it needed to have the appearance of being much older and used, while also remaining abstract to keep it in line with the original concept. We chose to make it look like it had been found and then placed on display in a museum.

One of the major challenges was creating the feeling of hundreds of pages without actually having to create each and every one of them, which would make the project impractical. Another problem was making the skull look old and used while still maintaining a clean appearance. We also wanted the shape of the skull to be easily recognisable, but not in such a way that would seem silly or unrealistic. For modelling we've used Maya, while shading and rendering with mental ray. Final texturing and postproduction work has been completed in Photoshop.

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Fedde Souverein

3DArtist online

Username: Souverein

Personal portfolio site
www.souverein.nl

Country The Netherlands

Software used
Maya, Photoshop

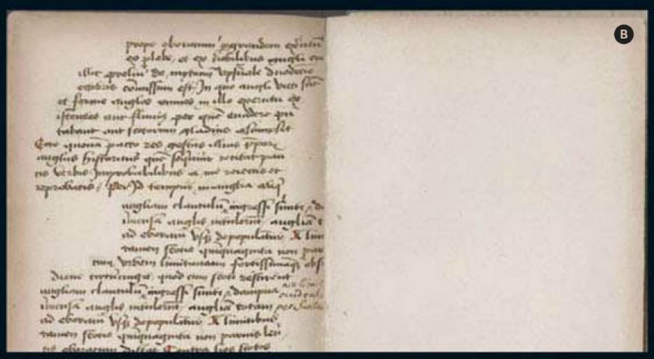
Expertise Souverein consists of a group of creative individuals who specialise in high-end image creation in various forms. It works together with photographers, autonomous artists, agencies and large-brand companies to combine creativity, years of experience and expertise to form outstanding visuals.

Its area of expertise is vast and includes: image manipulation, CGI/3D (stills and animation), project management, photography and fine-art printing.

Prepare and find references

Search for useful inspiration and look for textures

01 Skull reference One of the first important things we need to do is find a nice-looking skull that will form the base for our project. Using Google we can look around until we found something that fits our vision of what the book should look like. This process also helps us to understand that the teeth and sockets of the skull should be pronounced in the book, in order to keep the skull shape interesting A.



02 Texture the pages Having a good base texture is extremely important for a project such as this, so we have to create a high-resolution texture of an old book with handwritten text, as the final image will show the book close up. In our studio's texture database we have an image of an old book (note the importance of collecting and keeping good texture materials) that we can use as the base for our main paper texture. We also need the handwritten text (which we get from a picture of an old letter) to be combined with the old book texture in Photoshop B.

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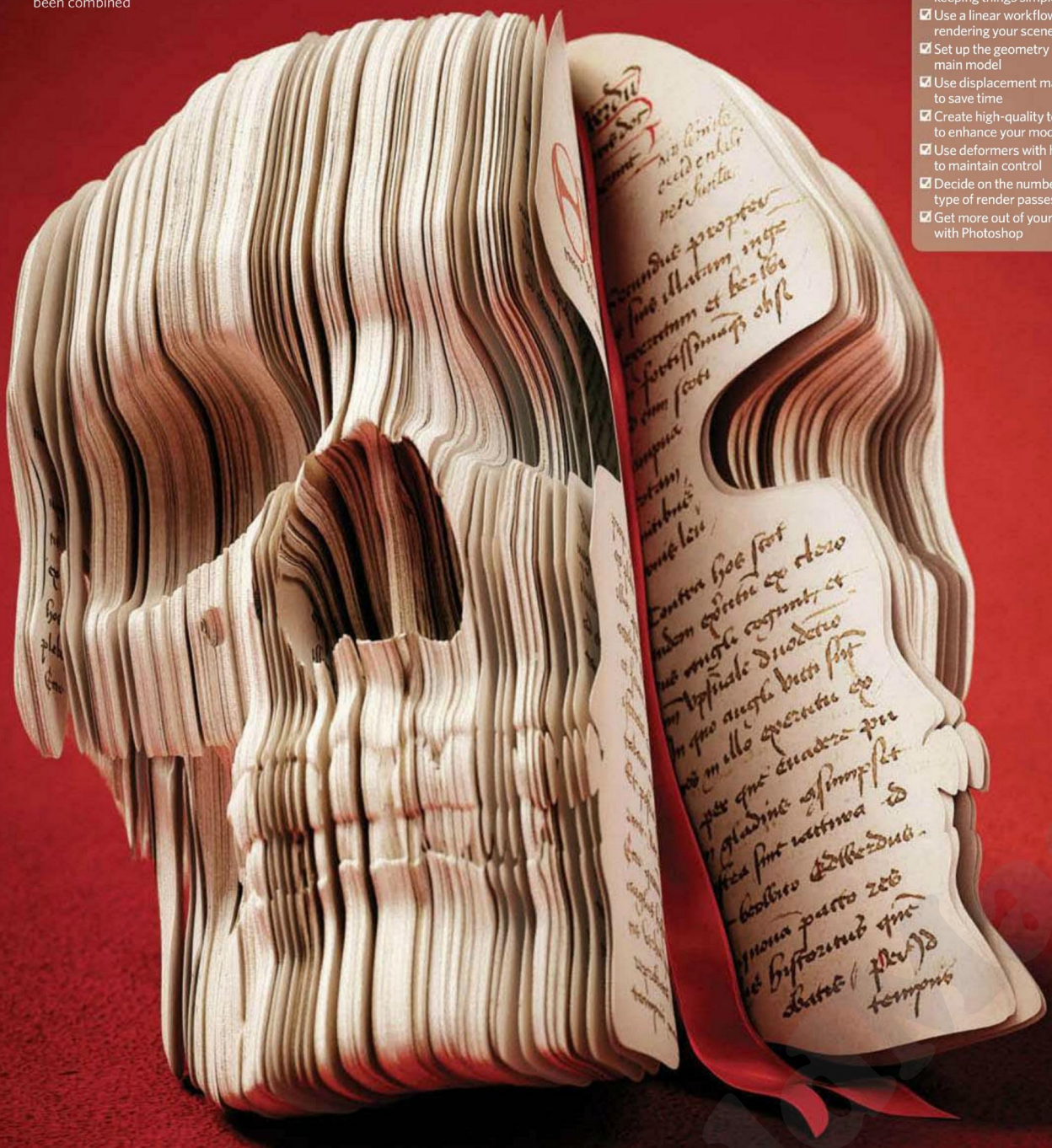
Ⓐ A beautiful skull that forms the base shape of the book

Ⓑ One of the page textures where text and paper have been combined



Learn how to

- Create complexity while keeping things simple
- Use a linear workflow when rendering your scenes
- Set up the geometry for a main model
- Use displacement mapping to save time
- Create high-quality textures to enhance your models
- Use deformers with history to maintain control
- Decide on the number and type of render passes
- Get more out of your renders with Photoshop

Concept

It was decided that we'd create the diary of a pirate explorer shaped like a skull. This is a mysterious looking book that could have been owned by an adventurer. Giving it a warm and clean look keeps it away from becoming too grim-looking and retains the realistic feel we're after.

Software used in this piece

Maya Photoshop

On the Disc

Skull Model.fbx – can be opened in most 3D packages

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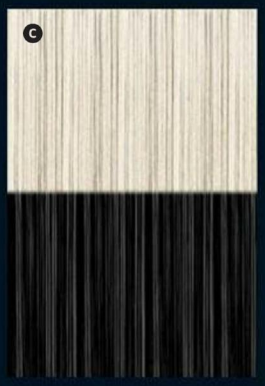
Model the skull

Create the base model and split it up



C The side of the book is colour textured and displaced

D The skull is created with polygons before being split up into separate pages

E Splitting up the model in multiple steps enables better overall control

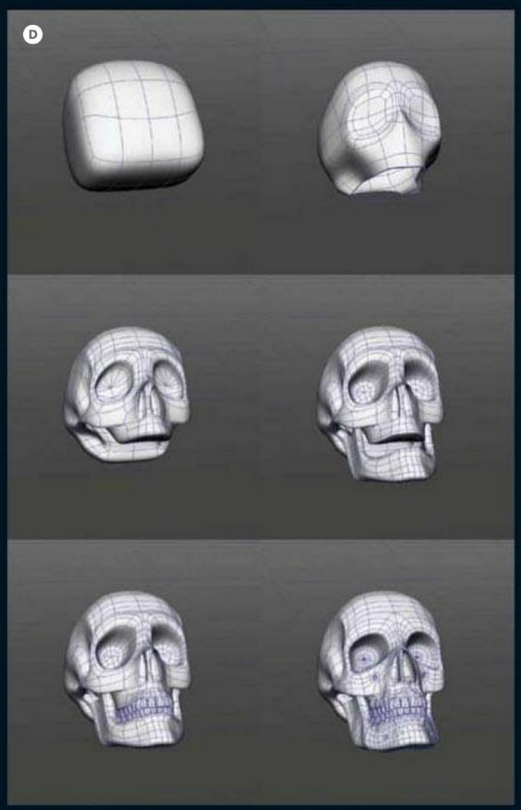
F Fix the different pages to give each of them a far more realistic thickness

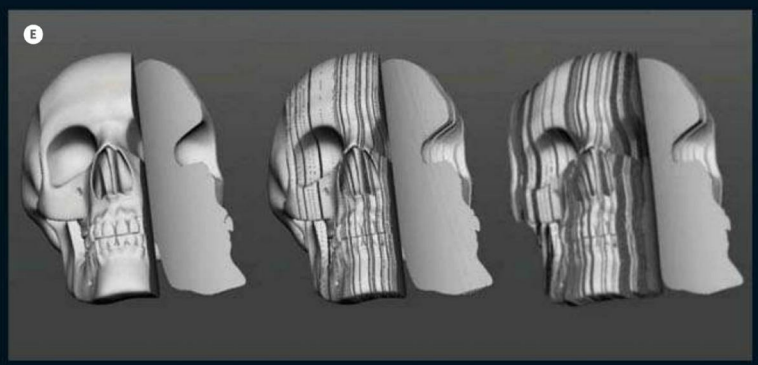
03 Texture the sides

As we don't want to create every single page (for practical reasons), we can create complexity in parts of the models with the help of displacement shading. We have photographed the side of an existing book to create a displacement texture based on the space between the pages. Do this by selecting these in Photoshop with the Color Range selection method C.

04 Shape the basic model

Part of the workflow we want to show is how to create the skull as a whole, because it enables us to first get the skull the way we want it. This way we have the freedom to decide where it should be split to maintain the shape as best we can. We work with a smoothing-at-render-time approach as this enables us to work with a relatively simple and adaptable model that can be previewed smoothly in Maya. By interchanging between Maya's Smooth and Native preview (respectively the number 3 and 1 keys in Maya) we can always see what will happen at render time. Always remember that it's vital to model the majority in quads in order to get the best results from this method D.



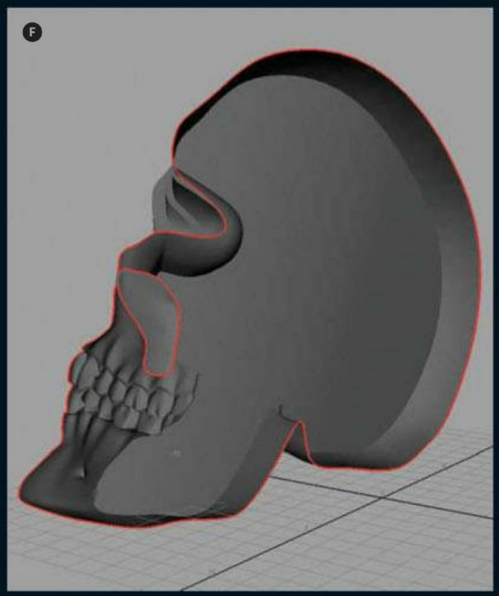


05 Split the model

Once the model is complete and we are happy with its shape and detail (too little would make it too bland, too much would make it too heavy for the system and unsuitable to cut a book from) we position the skull in such a way that we feel would best suit the final image. In this way we can see what the ideal placement will be to make a major cut in the middle (where the book will fold open). With the major cut in place, we choose the camera angle and focal length. Once we are satisfied with this we can make multiple cuts in the remaining pieces of the book E.

06 Fix the pages

Once the cuts are all made there is the tedious task of fixing all the slices. Each of the slices has to be given sides to create the actual pages. This is done using the Fill Hole tool when selecting the edges, and then inserting many extra edges to enable deformation later on in the process. If you don't do this and only use the Fill Hole tool, Maya will be unable to render the slices nicely when deformed. This process is used for all of the big slices. Later on, individual pages can be created to fill in the large gaps and create more complexity in the model F.



Problems and solutions

Creating high-resolution textures can be a daunting task, but is often very important if you want to reach a high level of realism. Getting proficient with a program like Photoshop (or any other image-editing program) and owning a digital camera (for shooting your own material) goes a long way when trying to get textures of a high quality. The internet also provides a rich searching ground for references or textures, with sites like **www.cgtextures.com** being particularly useful.

If you get textures from different sources it's important to get them to feel the same with regards to colour and lighting. This is true for our main paper texture and the texture for the side of the book: the side of the book was photographed from a completely different book and the two textures needed to be brought in line with each other.

Another problem is getting the side of the book to be a tileable texture, since the original book is only 5cm in width – even though it needs to be at least 25cm, or more. This can be fixed in Photoshop with the help of the Offset filter, which enables you to see the overlapping areas and fix them with the help of the Clone Stamp tool.

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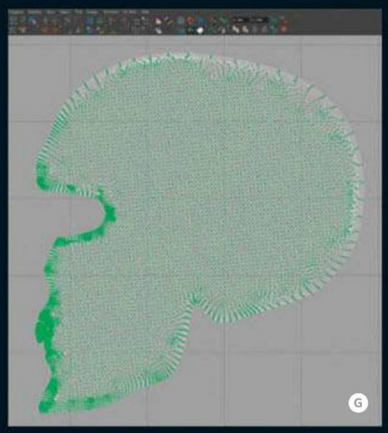
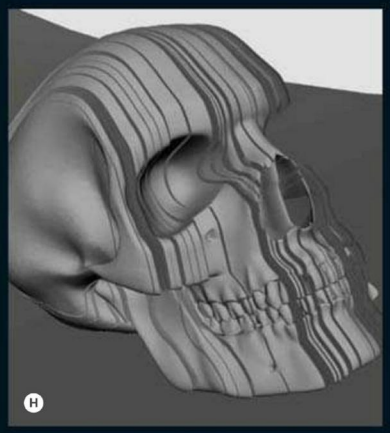
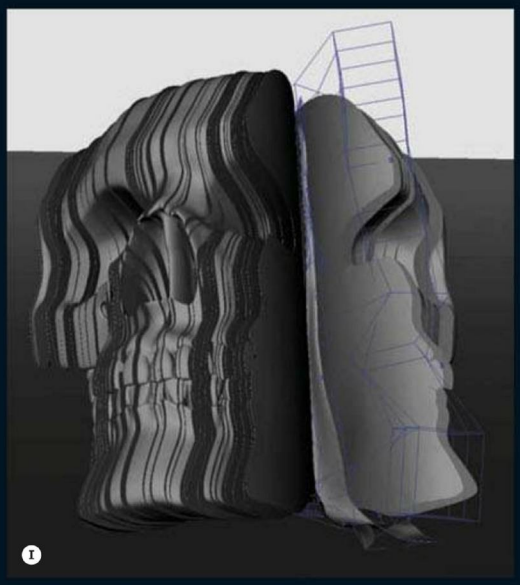
Add definition

Bring in more detail and begin lighting







07 Create the UVs This stage is always an important part of modelling when working with any kind of textures. With this project a big part of the look and feel of the parts making up the book is dependant on textures – namely Color, Bump, Reflectivity and Displacement. This means the UVs have to be very good and well placed in the UV space. For the sides of the pages and edges of the big slices we create Planar Mappings, after which we make cuts and use the Unfold option to lay out the UVs in such a way that they are usable. It's important to note that creating UVs has to be done before the addition of deformers, otherwise UV warping or other construction-history-related problems may often occur G.

08 Model and displace The main reason for choosing to split the skull into big pieces is to get the right level of displacement and extra detail required. This enables us some extra freedom with regards to how we want to sculpt the model. If the book had needed to be animated it would have required all the pages to be separate geometries (or at least many of them, depending on the animation), however this would have made it much more work-intensive and would have made the scene far too heavy to render in any reasonable amount of time. Complexity and detail should always be added as needed, as in this way you don't waste valuable time (modelling and rendering) on things that aren't necessary for your project H.

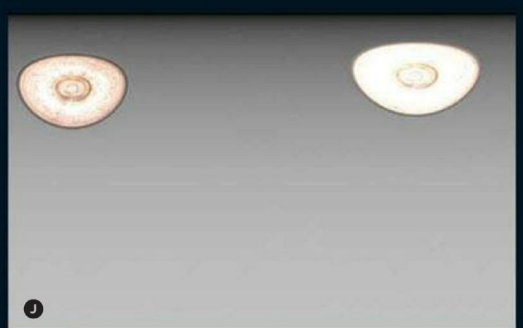
09 Use deformers for extra control After creating all the pages (some can even be added later in the process to give some extra detail when needed), we create various deformers to build the large and more subtle bends and deformations of the pages. Using numerous deformers enables us to continuously adjust the bending of the pages and even give us control over their general shapes. We look through the Render camera constantly in order to check if the adjustments have the desired effect on the shape of the book. In this way we can adjust the shape until we are satisfied with its silhouette and that the skull shape will remain intact I.

G The planar projections on the sides

H Side view of the skull that clearly shows the large geometry slices

I Using deformers enables greater and precise control

J The scene's lighting is achieved with the help of an HDR environment



10 Prepare the lighting We're going to do most of the lighting before the shading of the model because we want to see how the materials will react to the light situation. We choose Image Based Lighting (IBL) as the main light source and create an HDR (High Dynamic Range) image to light the skull. Final Gather is chosen as our indirect lighting model because it gives the best quality-to-render-time ratio for this project. It is important to have a high contrast and deep shadow to create an interesting and exciting situation for the book to be in, while still keeping enough light to give the image a clean feel J.

Working with quads and subdivisions

Subdivision/smoothing at render time is a very efficient way to model in Maya, as it enables your models to remain relatively simple, while rendering out nice and smoothly. It also means your scene will stay lighter, and modifying your model will be easier without the clutter of thousands of vertex points obstructing your view.

However, to get the most out of this workflow, it's essential to keep most polygon faces at four sides (quads); triangles or n-gons (polygons with more than four sides) may result in unexpected artefacts when rendering. Splitting up the pages and using the Fill Hole tool also means repairing some of the quads on the edges of these surfaces.

Another important point is to always keep an eye out for how your textures are reacting to the smoothing. Preview your textured geometry to see if any texture stretching or collapsing occurs. Inserting some extra edges at crucial points or editing some of the Smooth Mesh Extra Controls settings can solve a lot of problems.

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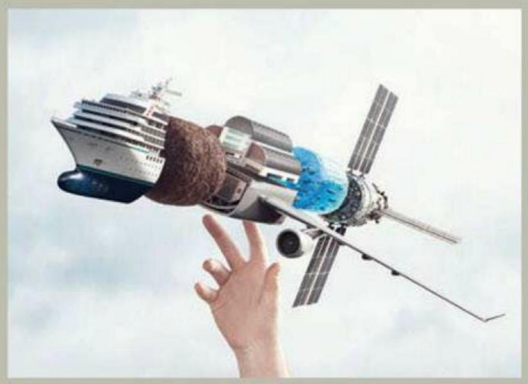
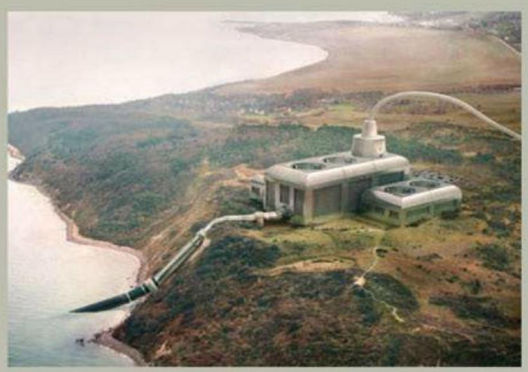
Artist showcase

Souverein

The studio has years of experience in the fields of CGI and image manipulation, and specialises in the high-resolution integration of 3D and photography. "We have worked for and together with many photographers and companies from all over the world," Fedde says.



Hobby Plane **Maya, Photoshop (2011)**
A promotional image created for the Hoge School van Amsterdam to attract new students

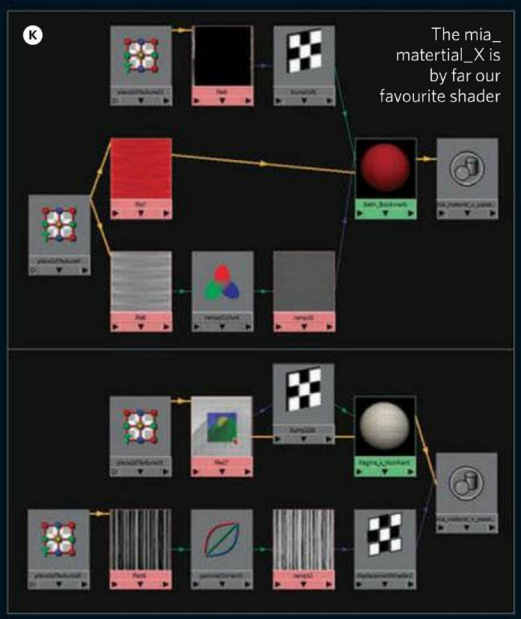


Socket Factory **Maya, Photoshop (2011)**
Part of series of images for Statoil created to show how they deliver gas all around the world

Handy Helper **Maya, Photoshop (2011)**
This multi-armed alien was part of a campaign created to illustrate that the company in question had the right people for the job

Shading and lighting

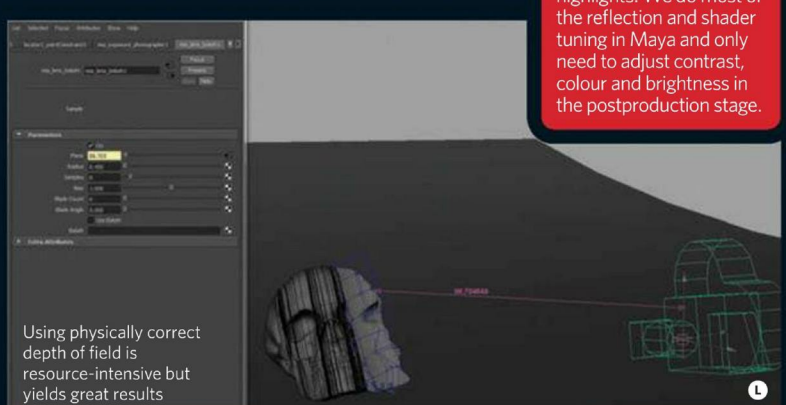
Create shaders and adjust the lights



11 Create the shaders Once the lighting is complete for about 80-90 per cent of the model (finishing when all the textures and shading is in place) we create the shaders for all the different surfaces. We work with the mia_material_x shader most of the time because it's a physically correct shader and works best with mental ray's method of rendering. The mia_material_x is a monolithic shader, which means it's one shader that can be used for (nearly) all materials you could ever want to create! Though at first glance it might look very complex to use correctly, it enables fantastic real-world material emulation K.

Passes and problems

With many different passes available to choose from when rendering in Maya, we have to decide how we want to render the final image and what kinds of passes we want and need. Splitting up the image into many passes with things like Color, Shadow, Reflection and Ambient Occlusion gives you a great amount of control. However, it's not always helpful – especially when working with still images – to render everything out in many different passes. The reason for this is that it gives different results from a normal Beauty pass, especially when working with things like DOF at render time. We render different Matte passes for various parts of the book and render an Ambient Occlusion pass as well. In this way we can adjust colour and contrast by masking all the different areas. We can also use the Ambient Occlusion layer to add further shadows and highlights. We do most of the reflection and shader tuning in Maya and only need to adjust contrast, colour and brightness in the postproduction stage.



12 Rendering depth of field Because we want to use depth of field (DOF) with our camera, we have to decide if we want to do this in postproduction (via filters) or at render time with a physically correct lens shader (like the mental ray Bokeh shader). Postprocess DOF has the advantage of costing much less render time and gives the ability to decide upon the amount of blur later on. However, the physically correct blur, although expensive to render, gives much better results, especially if the blurred area is very large. Seeing as this is a still image and not an animation, we decide (after some testing with both) to go for the rendered DOF, which gives some very nice touches to the final image L.

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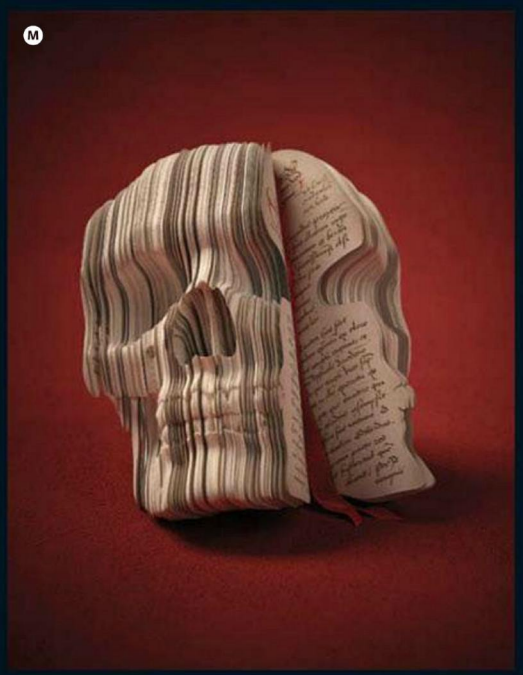
Postproduction advice

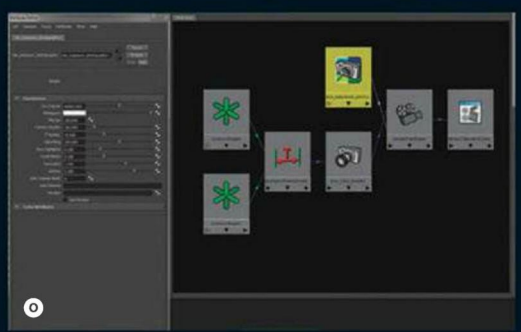
Learn how to get more from your renders

3 hours render time
Resolution: 6,000 x 6,000

13 The importance of post work
Postproduction is a critical part of nearly every CG job, mainly because it enables that extra bit of adjustment to help you get your images to a very high level. It also means you don't have to spend hours test rendering in Maya to get the colour and contrast just right. After rendering the image to a level we were happy with, we can work on the piece in post. We use Photoshop here to adjust contrast, shadows, highlights, colour and sharpness. Be careful not to make things worse rather than better with every curve or correction you apply to your image. You'll need to find a nice balance to achieve great results M.



14 Resolution and fine detail Rendering at high resolution means a lot of detail can (and must) be visible. This means that things you would be able to get away with at low resolution (for example a banner on the internet) are clearly not good enough for high-resolution images, especially when the objects are close to the camera. Textures need to be high quality and at a good enough resolution or they will appear to be blurry. Enough detail will have to be added to the geometry so that it appears complex enough to be photorealistic. Shadows, materials and (in the case of DOF) lens sampling will also need to be of high enough quality to be used up close, or they will appear grainy and therefore unusable N.



15 Linear workflow Working with Maya means that if you want to work in a physically correct environment (to get your renders to photoreal quality) you will have to work with a linear workflow. The reason for this is that Maya renders everything in gamma 1.0 and your monitor shows everything at gamma 2.2, which basically means that everything rendered in Maya appears to be too dark with too much contrast when viewing a render. This will lead to overblown highlights and light not being able to reach far enough. Explaining the technical details of a linear workflow within Maya will take a lot of time, so we suggest you turn to Page 80 in this issue where Digital-Tutors has supplied an in-depth explanation. You'll improve your renders a lot once you incorporate this process into your own workflow O.

M The Beauty pass before it gets adjusted in post

N The importance of good texturing and shading can be seen in the final image

O Exposure nodes enable a linear workflow

P Ambient Occlusion renders are very useful for many different purposes

Plan and think before you start

In a perfect world you would have an endless amount of time to work until you have the best lighting situation, perfect camera angle, noiseless shadows, optimal contrast and the nicest materials. However, with commercial jobs, you often have a very limited amount of time and the result has to be fantastic. This is why planning ahead and thinking about what you want to do is very important. At what resolution will you have to work? How close up will the model be? What kinds of materials will the object have? What kind of lighting do you want? What is the overall effect you want to achieve? When you have all of these things figured out, it will greatly reduce the amount of time wasted so you can spend longer on getting the shaders and lighting looking really good!

16 Final settings Putting an Ambient Occlusion layer on top of your images and walking through all the different blending modes in Photoshop enables you to see all kinds of options – and might give you some extra creative ideas. Alternate between blending modes, layer transparency and curves. Ambient occlusion renders themselves can also be rendered with different settings; changing the Spread or Distance attributes enables sharper ambient occlusion renders that will only accentuate the finest details P.

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I made this...

Incredible 3D artists take us behind their artwork

Artist info

Viktor Fretyán

Website http://radicjoe.cgsociety.org

Country Hungary

Software used 3ds Max, V-Ray, Photoshop

Bio Viktor is a 3D artist based in Budapest, Hungary

Rue de Seine 2012

I was always in love with this city, so I wanted to create a series of scenes from different locations, all in different styles and all with a little comedic relief. So far this is the first image of this series and I hope I'll have the will power to go on, as it took me six months just for this one image! I really don't feel like starting all over from scratch on another scene right now...

Software used in this piece

3ds Max · V-Ray · Photoshop

"Try not to use plug-ins... [from] experience it's so easy to find a cool look with a plug-in and use the same trick on all your images. It's better to do everything manually, for me. I feel more in control!"

"Always try to do something original. Even if it's not perfect, it's always better to appreciate something original than a perfectly clean image that's a copy... Nowadays there are quite a few studios and artists with a distinctive style"

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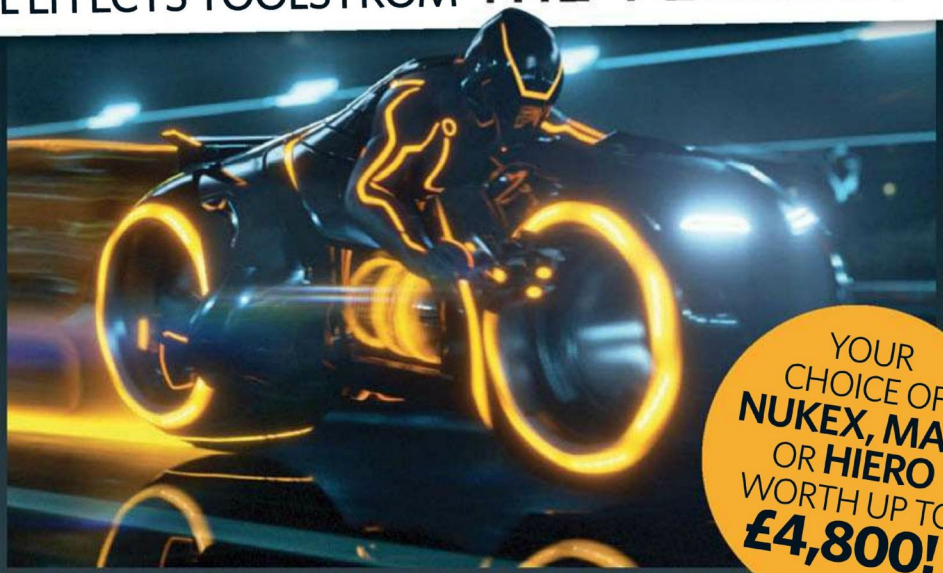
WIN YOUR CHOICE OF NUKEX, MARI OR HIERO

GET YOUR HANDS ON UP TO £4,800 WORTH OF VISUAL EFFECTS TOOLS FROM THE FOUNDRY

This is your chance to get your hands on one of The Foundry's revolutionary and award-winning visual effects software tools. Simply choose your favourite from NUKEX, MARI or HIERO, and head to **www.3dartistonline.com/competition** to complete the entry form.

It doesn't get much simpler than this: all you need to do to be in with a chance to win your preferred visual effects tool from The Foundry is choose your favourite from NUKEX, MARI or HIERO. Just enter your chosen product along with your name, email address and occupation at www.3dartistonline.com/competition before 1 October 2012. Then wait to find out if you've won!



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AWARD-WINNING PRIZES

Can't choose your favourite? Let us help!

NUKEX is the powerful, award-winning compositing tool that's been battle-tested on some of the most ambitious VFX feats ever attempted, including *Avatar*, *TRON: Legacy* and *Hugo*. This top-of-the-range node-based compositor is a Swiss army knife for artists looking to tackle complex compositing challenges in new and efficient ways! **Download a free 15-day trial at www.thefoundry.co.uk/nuke**

MARI is the revolutionary 3D digital paint tool built from the ground up to meet the needs of the most demanding VFX artists and matte-painters. Out-performing other paint tools in speed, flexibility and processing capabilities, it was the 3D paint tool of choice on *Avatar*, *District 9*, *Game of Thrones* and *Thor*! **Download a free 15-day trial at www.thefoundry.co.uk/mari**

HIERO is the pipeline in a box. It's the missing-link functionality to the visual effects pipeline that's helping to improve facility efficiency and shot throughput volume. It enables users to save time, maintain an up-to-date timeline, look at shots in context and standardise colour management. **Download a free 15-day trial at www.thefoundry.co.uk/hiero**

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© *Game of Thrones*, HBO 2011. Image courtesy of BlueBolt Ltd.

WHAT YOU CAN WIN

Pick your one favourite from the following:

- **1 x NUKEX 6.3v8** (individual value £4,800) includes one-year maintenance (value £800)*
- **1 x MARI 1.4v4** (individual value £1,200) includes one-year maintenance (value £200)*
- **1 x HIERO 1.0v3** (individual value £3,150) includes one-year maintenance (value £800)*

*Versions and prices correct at the time of going to print

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The 3D model

Here is a draft render of the modelled parts created and UV mapped using ZBrush and 3ds Max in the last issue

On the Disc

Zoom into the screenshots to see the specific settings José has used in this tutorial

Software used in this piece

ZBrush | 3ds Max | V-Ray | Photoshop

See issue 43 for part one of José's character tutorial

Learn how to

- ☑ Create custom hair from spline structures
- ☑ Use VRayHairMaterial
- ☑ Set up complex different V-Ray Materials
- ☑ Explore VRayFur's versatility
- ☑ Set the scene for physically accurate lighting

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Perfect lifelike materials

Lil' B 2012

Customise materials for a 3D illustration

José Alves da Silva is a freelance character artist

In the previous issue we modelled and posed the little girl and bee characters in ZBrush. At the end, we exported the models into 3ds Max along with several textures to help the creation of materials and new textures.

In this issue we will start by setting a physically correct lighting system in V-Ray with gamma correction, a sun lighting system and a physical camera. We will then focus on the creation and settings of materials as diverse as cloth, metallic tissue, skin and candy. Also, we will explain the techniques behind hair and fur creation used in this image, as well as the hair material settings. Finally, we will cover the render settings and the finishing touches in Photoshop.

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

José Alves da Silva

3DArtistonline

Username: zeoyn

Personal portfolio site www.artofjose.com

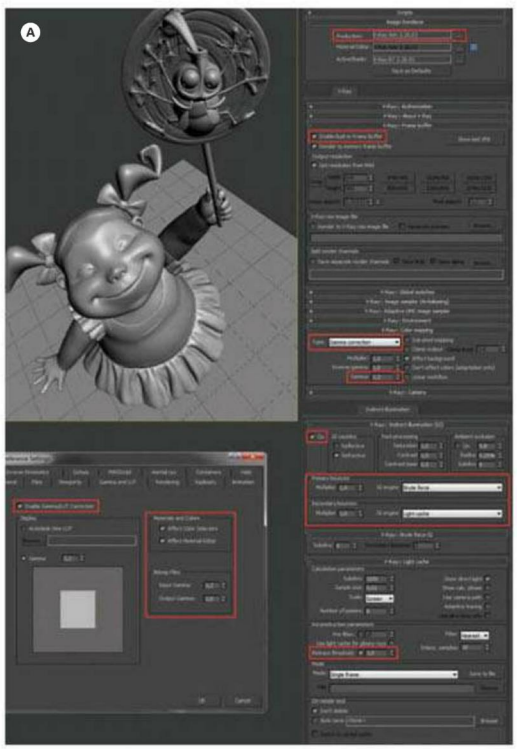
Country Portugal

Software used ZBrush, 3ds Max, V-Ray, Photoshop

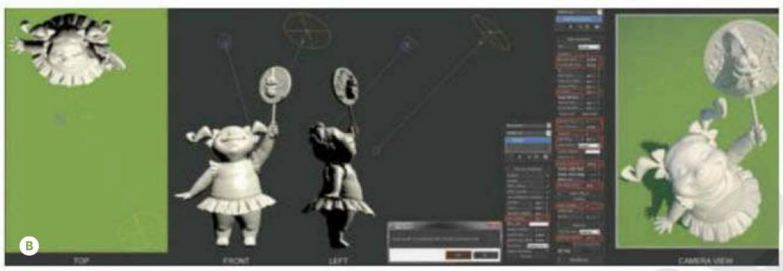
Expertise José specialises in character creation, ranging from 2D concept to the final textured 3D model and amazing full 3D illustrations.

Prepare your model

Set up your lighting, camera and colour settings



Ⓐ Using Gamma Correction will enable us to work with real-world light and camera settings



Ⓑ Despite using realistic camera settings we are not limited to real-world stock lenses

01 Scene setup In 3ds Max, open the scene we created in the first part of this tutorial series. If you missed the tutorial on the scene's creation, it can be found in **3D Artist** issue 43, page 64 (available at **www.imagineshop.co.uk/magazines/3dartist.html**). Delete the temporary doll, merge the final doll model and keep the camera and ground plane.

In the Preference settings enable Gamma/LUT Correction. Activate Affect Color Selectors and Affect Material Editor. Set Input Gamma to 2.2 and Output Gamma to 1. In Render Setup (F10), under the Common tab, assign V-Ray as the Production Renderer. In the V-Ray tab enable Frame Buffer. Set Color Mapping to Gamma Correction with a Gamma value of 2.2. Under the Indirect Illumination tab enable GI. Set primary bounces to Brute Force and secondary bounces to Light Cache. Under Light Cache enable Retrace Threshold Ⓐ.

02 Light and camera In Create>Lights>V-Ray choose VRaySun and place it at the front, above and slightly to the right of the girl. Confirm that you would like to automatically add a VRaySky environment map. In the VRaySun Properties increase the Size multiplier to 3.

Create a VRayPhysicalCamera (Create>Cameras>V-Ray), position at the same spot as the original camera and add a Roll of -20. In the VRayPhysicalCamera Properties set Film Gate to 27mm, Focal Length to 43mm and f-number to 4. Enable Specify Focus and set the focus Distance to fall between the bee and the girl's face. Decrease Vignetting to 0.2. Set the White Balance to Daylight, Shutter Speed to 1,000 and ISO to 50. Enable Depth of Field and set Distortion to 0.4 Ⓑ.

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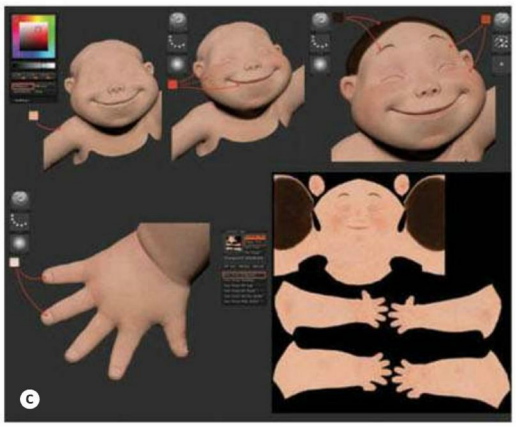
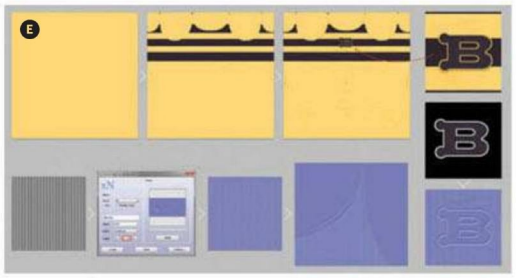
Add textures and materials

Create the maps and materials for the character



03 Paint the bodies We will use ZBrush to paint directly onto the girl's body and export the colour texture. Open ZBrush, enable RGB, set Color to Skin Pink and press Fill Object in the Color menu. With the Standard brush (RGB enabled, ZAdd disabled) pick red and paint the cheeks, lips, ears, nostrils and fingertips lightly. Pick a dark brown to paint the hair and eyebrows. Change the Brush Mode to Spray, pick Alpha46 and then, using several brown tones, paint freckles and skin irregularities. In Dots mode, paint the nails with a light pink.

Go to the Tool menu and, under Texture Map, press New from PolyPaint, Clone Txtr. You can then save the image from the Texture menu C.



05 Create a dress texture Start with a yellow background, then paint horizontal black stripes. Overlay the Cavity and Displacement maps with a low opacity. Linear Burn the Occlusion map to add extra detail. Draw a black B logo with a yellow outline and then open the Suit Normal map. To add more detail create a greyscale fabric pattern. Using the xNormal plug-in for Photoshop (by Santiago Orgaz, free to download: **www.xnormal.net**) choose the Height2Normals filter. In Swizzle, change to Y- and apply. Overlay the pattern to the Normal map. Create a copy of the B logo in greyscale and use the Height2Normals filter. Overlay the B to suit the normals E.

C Painting directly onto the model gives you instant feedback and solves any seam problems

D The Pink Skin preset in VRayFastSSS2 is a great start to create a skin material

E Create Normal maps from greyscale images and add detail to existing normals with Overlay

F Originally created for car paint, VRayCarPaintMtl works really well for glittering cloth

04 Apply skin material In 3ds Max, create a VRayFastSSS2 material and apply it to the body. Start with the Skin (Pink) preset. You can use the setting in the screenshot (image 'Step 04.jpg' on the disc). It's important to enable Trace Reflections in the Specular layer to reflect the environment. In the Bump slot choose VRayNormalMap and pick the Normal Map image for the body, not forgetting to set Gamma Override to 1.0.

In Photoshop, using the Cavity map as a base, paint the nails and lips with a lighter colour. Add subtle, lighter values to the cheeks and forehead. Paint eyebrows and hair with a dark colour. Apply this map to the Specular amount and Glossiness slots. In the SSS colour slot load the colour image painted in ZBrush D.

06 Design fabric materials For the suit, create a VRayMtl with a low Glossiness. In the Diffuse slot apply a Falloff with a peach colour as the second tone to add some softness. For the primary colour, load the Suit Color map created in Photoshop. Load the Suit Normal map to the Bump slot as a VRayNormalMap. To create the glittering material for the ribbons, sleeves and skirt, use VRayCarPaintMtl. You can find all the settings in the screenshot (image 'Step 06.jpg' on the disc). Set the coat Layer Strength to 0, to remove sharp reflections from it. Use a very high flake density to achieve the effect of glitter F.

Gamma correction and textures

In order to use a physically correct lighting system, the gamma of the display must be corrected in order for us to see the light behaving correctly on the screen. See Step 01 to find out how to make this correction in V-Ray.

With these settings, all textures will have a Gamma Correction of 2.2 applied when loaded into the scene. This is desirable for colour textures, however there are other textures in which the RGB value gives information that is not a colour. For example, a normal map provides the information of the normal direction. If the colours are changed, all the Direction information becomes wrong. In the case of specular and glossiness maps, the problem is the same because the value of the colour defines the intensity of the reflection.

Set Gamma to 1.0 for normal, glossiness, specular, bump or any other texture where RGB carries any information other than colour. When loading a Bitmap file choose Override in the Gamma settings and set it to 1.0.

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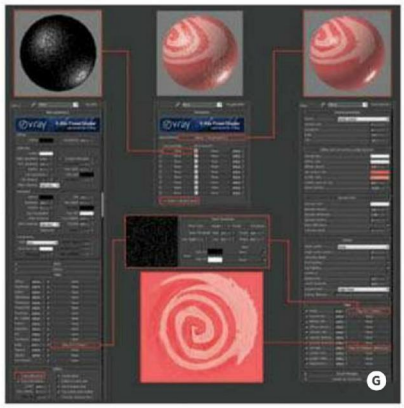
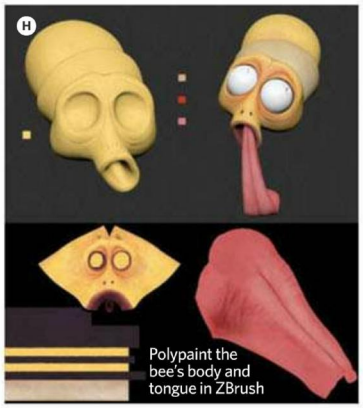




G Enabling Additive mode in Blend materials breaks some physics laws but makes the lollipop look a lot tastier

I Settings for most of the bee's different materials

Hair rules in V-Ray

The VRayHair material released with V-Ray 2.2 enables the hair to interact with GI, bounce and indirect light, and can be affected by area lights, integrating hair with the whole lighting system. This is great because prior to this release all indirect light on hair had to be simulated with a host of extra lights.

VRayHair material has settings that are specific to hair, like transmission colour and secondary specular, and will make it look great if you follow some very important rules. The first is that you must use GI in order for the light to scatter correctly in hair. The other is that light must work in a physically correct way, so use Gamma correction or a linear workflow.

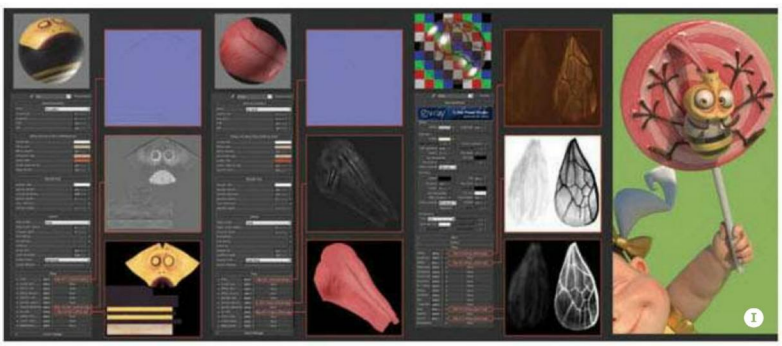
Another issue is that hair can be very thin and GI optimisations like Irradiance Map and LightCache can easily miss the hair strands. To get the best results use Brute Force in the Primary Bounces and Light Cache in the Secondary Bounces. But don't forget to turn on Retrace Threshold under Light Cache, as this will force the renderer to retrace the areas that Light Cache didn't handle correctly.

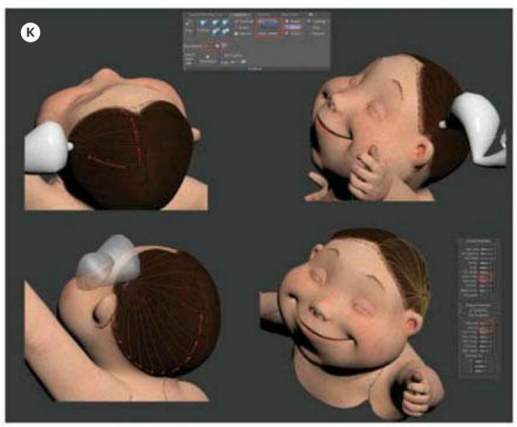
07 Work on the lollipop Create a VRayBlendMtl material. In the Base Material slot add a VRayFastSSS2 and choose the Marble (white) preset. Add a Noise to the Bump slot and, in Photoshop, paint the lollipop spiral in red and pink. Load this image to the SSS Color slot.

In VRayBlendMtl enable Additive (Shellac) mode. In the first slot of the coat material create a VRayMtl. Set the Diffuse to black, Reflect to white and Highlight Glossiness to 0.75. Under Options disable Trace Reflections. Copy the Noise created for the VRayFastSSS2 to the Bump slot G.

08 Paint the bee Use ZBrush and paint directly onto the model to create Color maps for the bee. You can reinforce the eye wrinkles with a dark orange.

Fill the tongue with a red and, using a Standard brush in Spray mode with a light pink, paint some differences. Under Tool>Texture press New from PolyPaint and save textures. In Photoshop, paint the black horizontal stripes on the body H.





J Creating splines from edges is a fast way to create hair guides

K Use Graphite Modelling tools to create hair guides by drawing splines directly on the model's surface

09 Bring in materials for the bee Create VRayFastSSS2 materials for the bee's tongue and body. Apply the Color maps in the SSS Color slots and respective Normal maps to the Bump slots. Starting with the Cavity map, create a Glossiness map for the bee's body and add brighter areas around the eyes and lips for a glossier effect. For the tongue, starting with the Displacement map, add contrast and apply to the Specular Amount slot.

Create a VRayMtl for the wings. Returning to Photoshop, create a greyscale image with white representing the wing structure and grey tones for the semi-transparent areas. Apply this map to the Opacity and Bump slots. Invert the image and apply it to the Reflect slot. Add a brownish version as a Color map and apply it to the Diffuse slot. The eyes can be replaced by an existing model if you wish I.

10 Guide for the hair Select one pigtail and all the edge loops along the hair, except at both ends. Press Create Shape from Selection, pick each shape's object and detach each spline into a new object. Select a spline and attach them one at a time, following a clockwise order. This is crucial because hair generates by interpolating from spline to spline. Enable Show Vertex Numbers under Editable Spline. The order must be the same in all splines, with a lower Number at the Root. If you find splines with different orders, select them and press Reverse. Detach a copy of the first spline and attach it so the first and last can be interpolated. Apply the Hair and Fur modifier and set Random Scale to 0. Also set Frizz Root and Tip to 0 J.

11 Complete the hair Select the head object and, in the Graphite Modeling Tools menu, select the Freeform tab. Set Change Draw on: Grid to Draw on: Surface. Press Pick and choose the character's head object. Set Offset to 0.1 and under PolyDraw set Min Distance to 2 (in Units). Click on Splines Mode and draw splines on the girl's head starting at the hairline and ending at the centre of the ribbon. Draw them in a clockwise order to avoid having to reorder the splines later.

Select the new splines object, adjust the vertices to sink into the skin at the hairline and lift up at the ribbon area to suggest a continuity with the pigtails. Apply the Hair and Fur modifier and set Random Scale to 0, then Frizz Root and Tip to 0 K.

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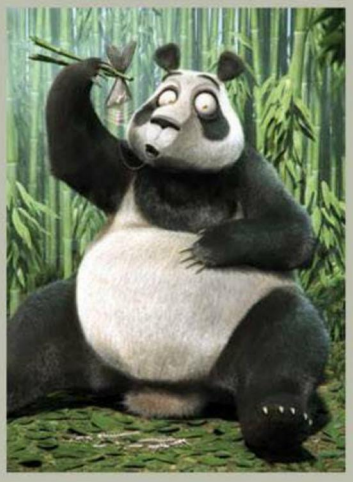
Artist showcase

José Alves da Silva

José is a 3D artist working as a full-time freelancer. Dedicated to 3D illustration and character creation, he started working in the 3D field in 1996 and his passion for characters have led him to embrace this creative area. He's worked with many different teams from around the world in the advertising, games and films.



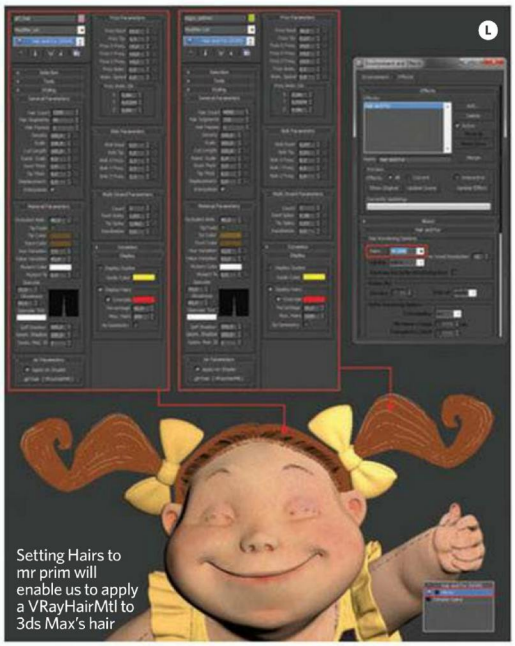
***A Break from Bamboo* (2011)**
This surprised panda was created for a step-by-step tutorial in **3D Artist** issue 29, which is available as a back issue at **www.imagineshop.co.uk/magazines/3dartist.html**

***Philthy Rich* ZBrush, 3ds Max, V-Ray (2012)**
Head model of the hip-hop artist Philthy Rich. This was created as part of the art included in his recent music album *Killzone*

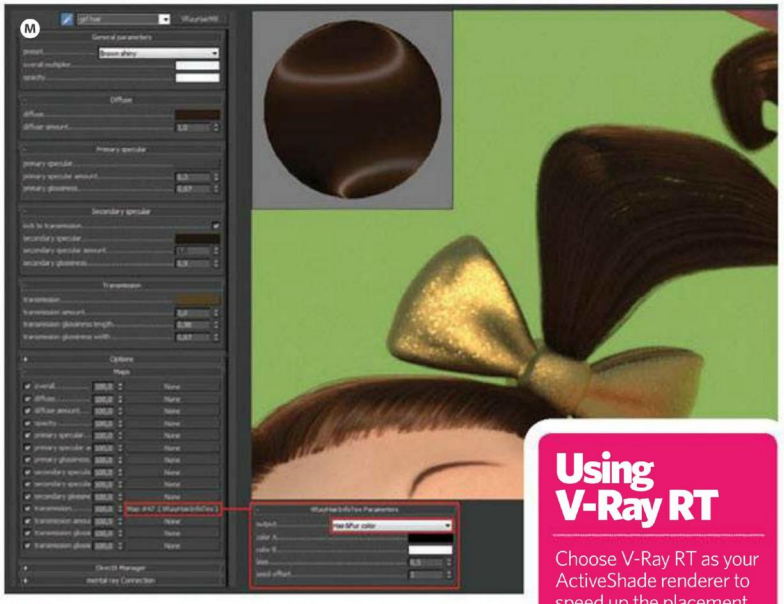
***Xincubator* 3ds Max, ZBrush, V-Ray (2011)**
An image created for a company website for Xincubator. The X represents the idea being created, while the scientists are caricatures of the clients

Hairy stuff

Details for settings and materials



12 Adjust hair settings The screenshot ('Step 12.jpg' on the disc) shows all the Hair and Fur modifier settings for the head and pigtails. The hair thickness remains constant on the head and decreases at the tip of the pigtail. The colour varies from root to tip on the pigtails, with a lighter brown at the tip. The Frizz Root value is increased to add variety. While very subtle Kink values add an even more natural look to the hair. The Multi Strand count is also increased with some Root Splay to add hair density. Mirror the hair and pigtails to the opposite side and, under the Rendering>Effects tab, set the Hairs to mr prim L.



13 Add shading to the hair In the Hair and Fur modifier, under mr Parameters, enable Apply mr Shader and place a new VRayHairMtl material in the slot. In VRayHairMtl select the Brown Shiny preset.

Transmission Color is what determines the overall hair colour. Increase the Transmission amount to 2.0 and add a very dark brown to the Diffuse Color. In the Transmission map slot use VRayInfoTex and under its Parameters set Output to Hair&Fur Color to use the colours on the Hair and Fur modifier (Tip and Root colour). This way it will also benefit from the Hue and Value variations M.

Using V-Ray RT

Choose V-Ray RT as your ActiveShade renderer to speed up the placement and setting of lights and cameras. You can interactively see the adjustments of exposure, ISO, depth of field and camera distortion, without making render after render. It's also great to fine-tune materials, even though some properties like SSS can't be shown in real-time.

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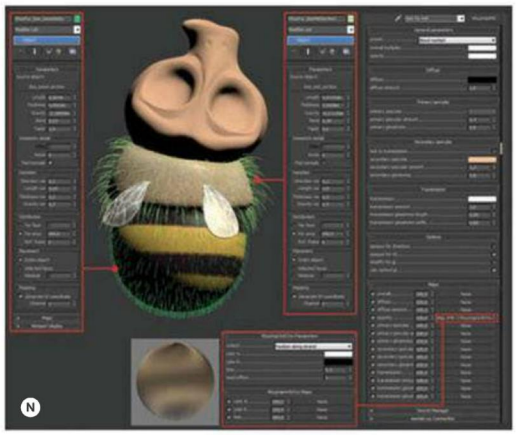
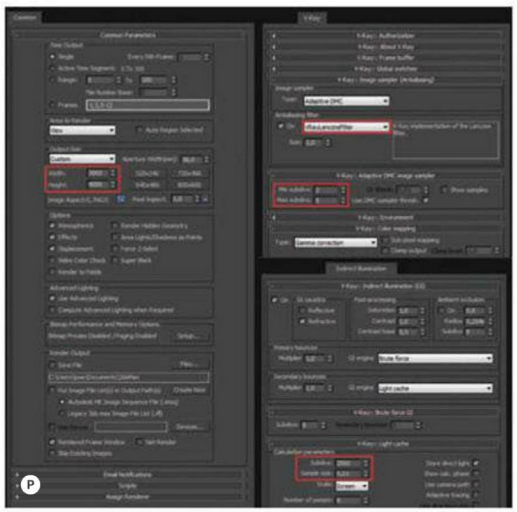
Final fur material

Apply fur to the bee and make final adjustments

5 hours render time
Resolution: 3,065 x 4,000



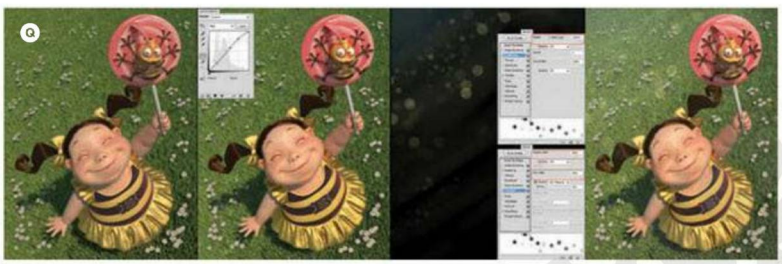
14 Add fur to the bee Separate the bee model into three objects: head, mid-section and lower body. Select the mid and lower body and choose Create>VRay>VRayFur. Select the VRayFur object and follow the settings on the screenshot ('Step 14.jpg' on the disc), and disable Flat normals for the fur to have a round section. For fur material apply VRayHairMtl starting with Blond matted preset. For a smoother look, make the hair tips transparent using the VRayHairInfoTex in the Opacity map slot. Swap colour A with colour B to have white at the root and a black tip. For better rendering, enable Opaque for GI in the VRayHairMtl options. On the body fur apply the colour to the Transmission slot to get the bee's stripes N.



16 Render your scene To render the final image, set the resolution to 3,065 x 4,000 in Render Setup. Set the Antialiasing filter to VRayLanczosFilter. Increase the Adaptive DMC Minimum subdivisions to 2 and the Maximum subdivisions to 8. In the Indirect Illumination parameters increase the Light Cache subdivisions to 2,000 and reduce the Sample Size to 0.1. Render and save the image as uncompressed 16-bit TIFs to have a good tonal range for colour correction P.

15 Make final fur tweaks To finalise we'll use VRayFur for some extra details. I apply it to the head and legs of the bee to create some micro fur. To create the girl's eyelashes select a strip of polygons from above and below the eye opening and detach a copy. Apply VRayFur with a negative Gravity value to make them curve upwards.

On the ground plane apply VRayFur to create grass, using large fur with Flat Normals enabled. Use a VRayMtl with a grass image applied to the Diffuse Color as the fur gets the UV co-ordinates from its base object, enabling it to create multicoloured grass. Some daisies are also added to the grass O.



17 Postproduction work In Photoshop, choose Curves under Image>Adjustments. Add points to the upper-right side of the curves and move them up to add some extra brightness to the highlights. To add depth to the image, paint a light-blue colour on the upper-left corner on a layer with a Screen blending mode.

Create a new brush starting with a regular round brush. In the Brush palette, under Scattering, enable Both Axes and set the value to 1,000%. Under Transfer, set Opacity Jitter to 85% and Flow Jitter to 96% to randomise the opacity. Use this brush to paint floating particles on different layers and apply different Gaussian Blur values to each layer to simulate depth of field. Set all the layers to the Screen blending mode Q.

The versatility of VRayFur

VRayFur is a simplified fur system that enables us to cover any object with fur quickly. I used it in this tutorial to cover the bee's body with fur. However, I also managed to create the girl's eyelashes by applying it to a strip of polygons. The grass was also made with VRayFur. In architectural visualisation, it's common to use it to create carpets. It's a versatile tool, but you have to use your imagination!

M With VRayHairInfoTex you can apply a colour ramp from the root to the tip of the hair strand

N Break the bee into three objects to apply different fur types to each part

O The many uses of VRayFur

P The final render settings

Q Some defocused particles add a bit more interest to the upper-left corner

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I made this...

Incredible 3D artists take us behind their artwork

Artist info

Bastien Grivet

Website www.grivetart.com
Country France
Software used
CINEMA 4D, Photoshop
Bio Bastien is a talented digital artist with a great eye for sci-fi landscapes and characters

"I chose to tell my story with a sunset light cut by some distant clouds – it's my favourite part of the day. My advice is to create all your light in 3D software, as it helps for the next steps in Photoshop"

Software used in this piece

CINEMA 4D | Photoshop

Alone on the Road 2012

A big city, a deserted bridge, an unlucky guy – maybe the beginning of a great story? I started this work with no real inspiration, I just wanted to create something really big, with complex cube structures. Gradually it became a futuristic city with a huge road and a bridge.

One of the tricky steps was to find a good point of view, with great depth, a good composition and perfect lighting. After hundreds of tests (no less!) I found a good approach and added a crashed car – just to try it out. It was the perfect start for a good story that asks a lot of questions.

"Taking your time... is still an important factor in the creation of a great illustration. Take the time to think about your architecture, your blocks of buildings, roads, lights and composition. Take a rest, wait a day at least, have a new look at your creation and see how you can adjust it"

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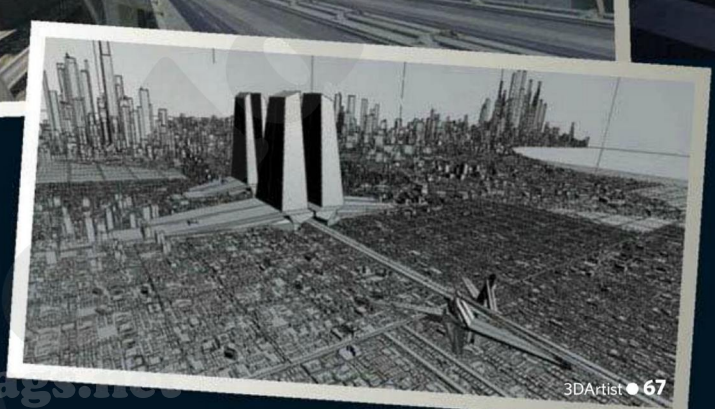
> Every hour or so, make a symmetry of your project in Photoshop. You will get a new vision of your work, and some mistakes that you haven't seen before will be evident after this little manipulation



> To make the most realistic environments, the best structure or architecture, you need to have good knowledge about what is around you. Learn the structure of buildings, streets and the city in general. Know how a forest or a mountain is right or wrong

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Sculpt dynamic anatomy

Dancer (2012)

"We're going to use ZBrush to capture motion and perfect the anatomy of a dancer while jumping in mid-air"

Federico Scarbini is currently working as a modeller and texture artist at The Moving Picture Company in London, delivering assets for various feature films

Here we'll go through the process of digitally sculpting a jumping dancer, capturing the gesture and the motion in the pose as well as reproducing highly realistic muscle definition. We start with a base mesh to sculpt the primary volumes, secondary volumes and details. As we want to have very precise muscle forms we will do this with a posed mesh and avoid using symmetry. We'll then create clothes and hair using tools such as Mesh Extraction and DynaMesh, before lighting the figure and rendering out different passes.

Concept

In the concept stage I focus on finding a dynamic pose with a gesture. I want something that will be interesting for the tutorial, so here we have a totally asymmetrical pose.

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Federico Scarbini

3DArtistonline

Username: loden

Personal portfolio site
http://federicoscarbini.com

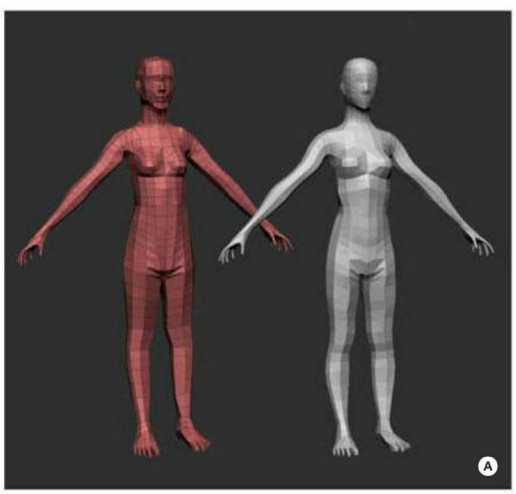
Country UK

Software used
ZBrush, Photoshop

Expertise Federico's areas of expertise include modelling and texturing with a focus on characters and creatures. He also does concept art, character development as well as surfacing and lighting.

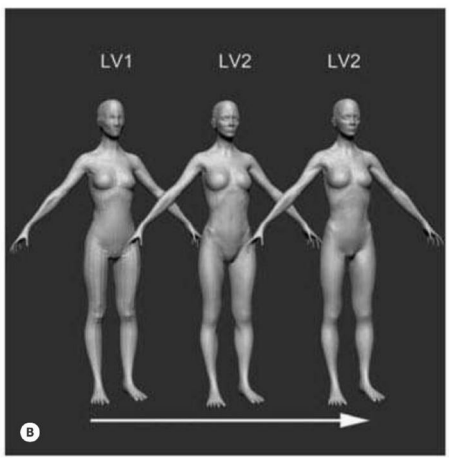
Sculpt an anatomical base mesh

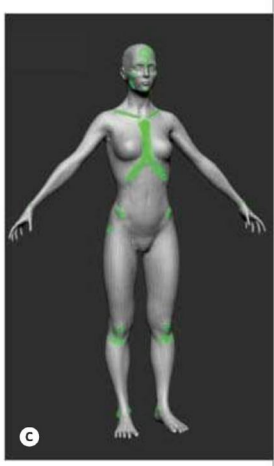
Build a foundation, adjust the proportions and make a first pass



01 Sculpt the base mesh Planning a good base mesh will help you during the whole sculpting process. Some of the key features that are important include: having an evenly spaced and clean geometry; having as many quads as possible and trying to avoid poles (vertices with more than four edges connected). Besides this it's important to have a good flow of the edges and also pay attention to where you want more details to be. For example, you may want to have a denser mesh in the face, hands and feet. You will find the base mesh has been supplied for you to use and follow along with the tutorial on the disc A.

02 Define your model's bony landmark areas
In the first sculpting pass we will make a quick adjustment to the proportion of the base mesh using the Move and Inflate brushes. We then subdivide the mesh once and start to define some general volumes, constantly checking the silhouette of the figures. After this we subdivide the model once more and start to sculpt the primary volumes with the Clay Buildup brush. At this stage we should take care of the broad volumes and the plane changes in the forms. It's a good time to start defining bony landmarks to guide us in the sculpting, like the iliac crest, sternum, clavicles and knees B.





03 Make the first pass In this step we'll define more of the primary forms and some of the secondary ones, where we have enough resolution. We should try to set more of the planes of the body and use the landmarks to guide us to define everything with the right proportions and forms. We'll also start to define some of the face with the same process we used for the body, using landmarks of the skull first and then adding flesh on top. It's highly recommended that you use references or schematic drawings in these first stages C.

A The wireframe and shaded base mesh

B The sculpting progress from the base mesh to a defined figure

C The model shows the first sculpt pass, defining landmarks and primary volumes

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Software used in this piece

ZBrush | Photoshop

SPECIAL
MASTER ANATOMY
Comprehensive guides

Learn how to

- Analyse references
- Sculpt volumes of a figure
- Deal with all levels of detail
- Pose the body using the Transpose tool
- Use ZBrush Mesh Extraction to create clothing
- Sculpt many different kinds of fabrics
- Create hair with DynaMesh
- Use a LightCap to light your character well
- Render out different passes for compositing

On the Disc

- basemesh.obj, ambient_rims.ZLD, mainLight.ZLD
- 100 anatomy references

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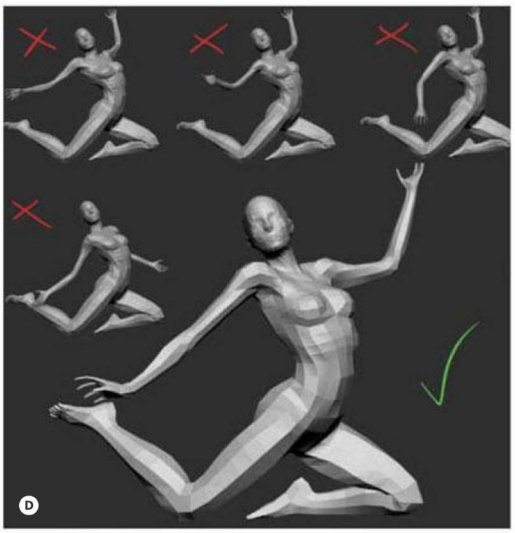
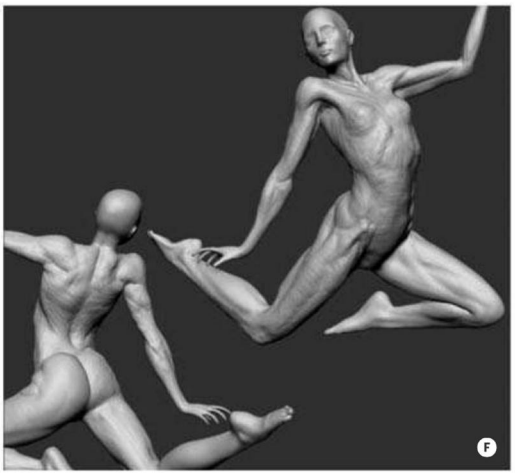
Pose and continue sculpting

Pose the character and define the final look of the body

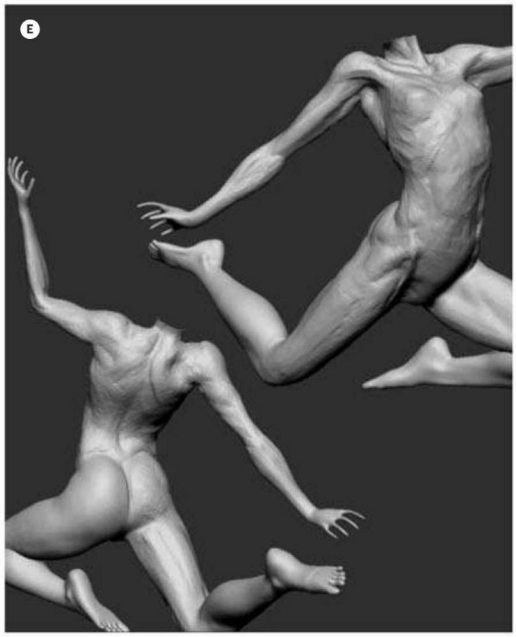


04 Pose the figure This is a very delicate step because choosing the right pose is never simple. Using Transpose, try different poses using photos as references. What we're looking for is a way to keep both the tension and the gesture of the pose, in order to make it very clear to the viewer exactly what movement we're trying to communicate in the illustration. Some of my first attempts gave the impression she was falling, but we want her to be at the peak of the jump. Another key consideration is avoiding breaking your anatomy D.



06 Refine the anatomy Now that we have a good base of the figure, it's time to subdivide the mesh and start refining more of what we already have there, adding a level of complexity. Until now we have been mostly worried about getting the right shapes in the right place. Now we want to give an overall adjustment using the Move brush and cut more planes in the volumes to add details using the Clay Buildup brush. Work on the whole body focusing on the arms, torso and legs. With more resolution we can now define more precise shapes, for example in the lower legs. In this pose the right leg needs to have a very pronounced peronæus and we want to define the head of the fibula. Having a good set of references is crucial to understand how to sculpt these areas F.

05 Define the muscles It's time to start working on the posed figure. From now on we'll work without symmetry, because we're working on muscles that are doing different things from one side of the body to the other. Focus on getting the pectoral muscles working the right way, from the chest to the outer side of the humerus, under the deltoid muscle. For the right leg we want good definition for the tensor fasciae latae and the posterior part of the knee. For the left leg we need good definition of the hamstrings and some nice sculpting of the gastrocnemius squeezed up against the upper leg E.



07 Smooth the sculpt Now we'll smooth the construction lines and planes we've been using so far to study the pose. This will achieve a clean surface that's much closer to skin. After using the Smooth brush to quickly even out the surface, we use the Clay Buildup brush to enforce some of the shape we had from the previous sculpting. Sculpt in more anatomy, such as landmarks for the rib cage, the iliac crest and on top of the external oblique. Go through the refinement of the gluteus medius and maximus and start to hint some of the construction of the knee, like the tendon of the biceps femoris that attaches to the head of the fibula G.

How to use Transpose to measure a figure

While dealing with proportions, it's handy to use the Transpose tool. If you go into Move mode while Edit is active, you can activate this tool. If you click and drag on top of the model it creates a Transpose line that will let you manipulate the model. If you move the two extremities of this line from the top of the skull to the chin you have the head measure. If you then go into the Preferences palette, down to Transpose Unit, you will find a slider called Calibration Distance. If you enter 1 in this slider you will set the current length of the Transpose line to 1. Now, when you draw the Transpose line again, you can use it to measure the proportions in head units – you will see the actual length from the top-left corner of the ZBrush interface.

D Different tests to find the exact pose we are looking for

E Using Clay Buildup we start to define the anatomy of the posed figure

F More work on the anatomy, focusing on adding another level of complexity

G Smooth out the construction lines and complete further work on the anatomy

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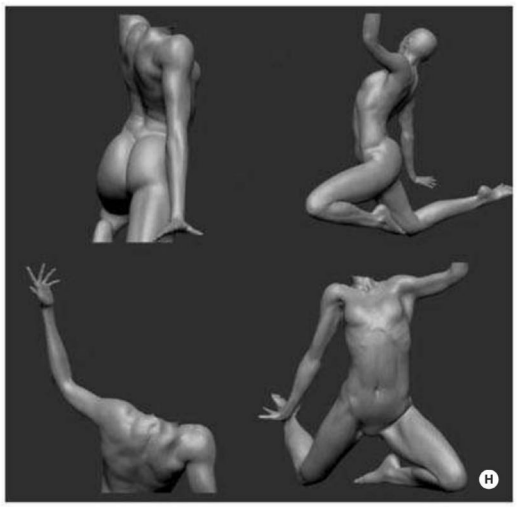
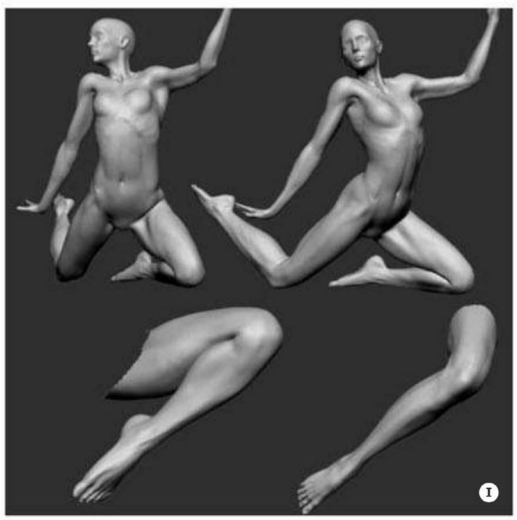
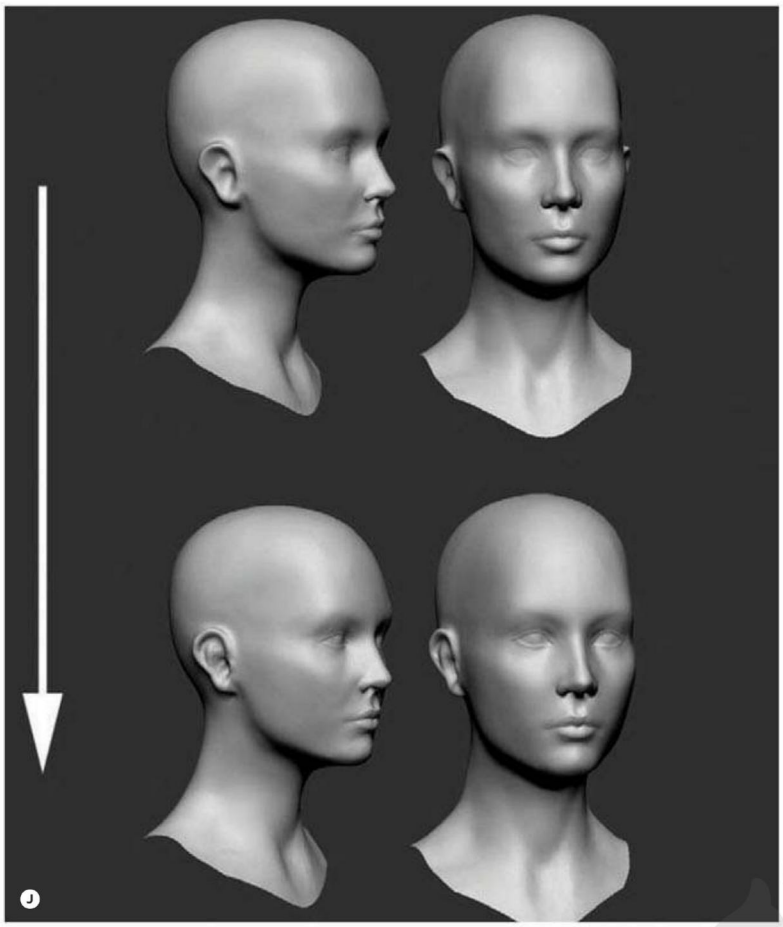


08 More anatomy work Sculpting the anatomy requires a lot of study; since we are dealing with a 3D model the shapes must work from every angle. The forearm needs a lot of attention because there is a lot of complexity formed by the extensor muscles, especially for the right arm that's twisted. It's a good time to hint a bit of the serratus anterior that creates finger-like shapes intersecting with the external oblique attached to the ribs H.



09 Sculpt the legs The right leg is in an extreme position, so for this reason the mass of the tensor fasciae latae is clearly visible just below the iliac crest. The fascia latae itself slices the lateral head of the quadrices, going down to attach to the lateral side of the tibia. The hamstring group of muscles is in tension so it bulges out and creates a silhouette form. The left leg is bent and from this point of view you can see the sartorius slicing the volumes between the medial head of the quadriceps and the gracilis and adductor muscles. These muscles create a nice bump on the side of the leg. The gastrocnemius forms a nice double bump coupled with the soleus. For both legs remember to sculpt not only the muscles but also the bones of the knees that create the surface forms in a bent knee I.



10 Shape the head Sculpt the head on a separate ZTool, using the one we started with in Step 3 to begin, because we want to have the symmetry working for the head. As a subject, the head is as complex as the whole body, because of its enormous amount of variables. That being said, since we don't have any particular reference to use we just try to stay with some generic proportions – you can easily find schematic drawings of the ideal head online. Pay a lot of attention to the skull and the right proportions (from every angle) between its landmarks, like the jaw, eye sockets, cheekbones and nose. The female face is usually more difficult to sculpt because the facial traits are less marked. The expressiveness in the eyes and lips are vital, so pay a lot of attention to nicely sculpt those areas J.

H You will usually only see four muscles of a six-pack – the top two are rarely visible

I A precise sculpt of the legs' muscles form is crucial to deliver believable anatomy and to support the gestures

J While sculpting, a good habit is to turn the model lots to get the forms working from every single angle

An ècorchè study

Knowing the name of all the muscles isn't really necessary. What is important, however, is to remember their shapes and how they react in different positions. In order to study anatomy it is highly recommended that you do some ècorchè studies: collect photo references and try to trace on top of them the muscle shapes, using muscle tables as a reference. The Masterclass tutorial by pro artist Scott Eaton on page 76 teaches more about ècorchè studies, and there are helpful references on the disc.

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Create and sculpt clothes

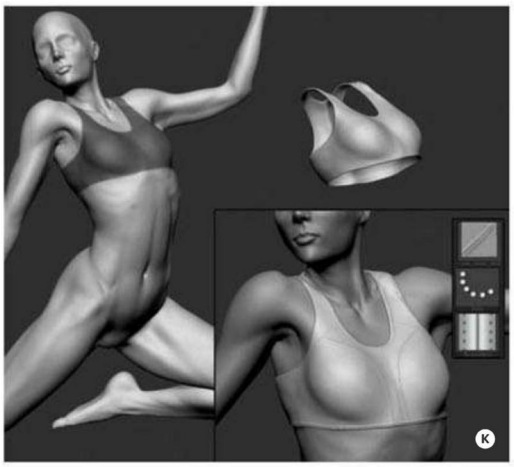
Use ZBrush's tools to create clothing for the character

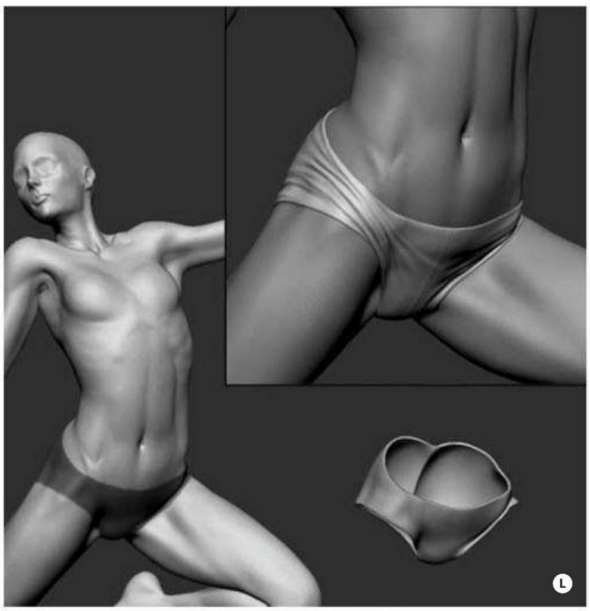
How to use FiberMesh

To create the forearm wristband in the final image, I apply the same technique used to create the bra and hotpants, but once I have the geometry in place I use FiberMesh to create a spongy look. I set the fibre to be short and adjust the Root scale and Tip scale to reach the desired look. I then tweak the Direction Variation parameter to give to the fibre a more chaotic look!

11 Create a fitness bra To create a fitness bra, start by using the Mask Pen to draw a mask on top of the body that will then be used to define the region to be extracted as a SubTool. Once done with the masking, in the SubTool palette, click the Extract button. ZBrush will show a preview of the extracted mesh. The thickness will vary depending on the scale of your mesh. Once happy, hit Accept to create the mesh as a separate tool. I'm using a Ryan Kingslien brush called ryan_seam_doubleFoldNStich to create the seams: http://tinyurl.com/3Dbrush K.

12 Add some hotpants Using the same technique for the bra, we create the hotpants. Pay attention to the forms you are extracting. Since you need some decent resolution to get a precise mask, you may end up having a dense base mesh that doesn't easily enable smooth, broad tweaks. Use the Standard brush with Lazy Mouse active (this can be found in the Stroke palette). Sculpt in some wrinkles to give the fabric the right tension and represent an elasticated, thin material. Be careful not to apply too much or too little to this area, however, but gradually apply to build up the realism of the clothing L.





13 Make a vest top To create the vest we'll use a different technique: quickly model a mesh in Maya (you can use any poly-modelling 3D software) starting from a cube, and use the Split Polygon tool to conform the surface to the body previously exported to use as a guide. Import the mesh into ZBrush as an OBJ and slowly sculpt it with the Standard and Move brushes. Once you get the right motion, use the Clay Buildup and Smooth brushes to sculpt the wrinkles. Always keep in mind that fabric reacts to gravity and thrust, so assuming that our figure is jumping, the gravity will push the cloth down. Since the vest is a little loose, we will have wrinkles formed by the motion, going in the same direction. The breasts will block the motion – there are no wrinkles there – but once the fabric leaves the breasts, wrinkles will start to form. Use cloth to enhance the motion of your character and don't be afraid of sculpting wrinkles. Once you're familiar with the physics, it's fun to play with them M.

K Use the Extract feature in the SubTool palette to create a fitness bra for the figure

L Use references to create believable wrinkles and folds for cloth

M Create the vest using a base mesh created in Maya – or any other 3D software

Artist Showcase

Federico Scarbini

Federico Scarbini is a self-taught Italian artist based in London. Working for The Moving Picture Company he delivers assets for feature films. He has worked for many years on commercials, art installations, arch-vis, illustrations and in the medical field. Recently he's delivered articles and tutorials on character development for various publications.

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***Digital Maquette tutorial,* ZBrush (2012)**
This image was created for a video tutorial presented by Digital-Tutors. The tutorial focuses on creating a digital maquette. It details the early concept stage through to the final illustration.

Concept by Björn Hurri, http://bjornhurri.com

***Goblin King,* Maya, ZBrush, Photoshop, Marmoset Toolbag (2011)**
A real-time render of a low-poly character created during a CG Workshop taught by Katon Callaway on high-end fantasy game art. The original concept is by artist Björn Hurri.

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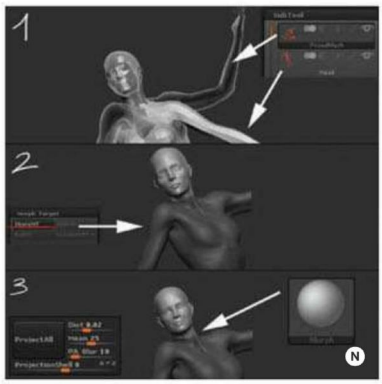
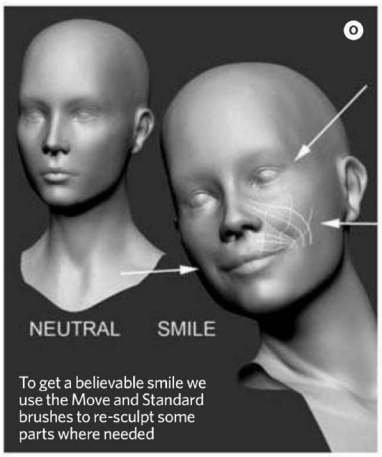
Sculpt flowing hair

Transfer the head back to add a smile and sculpt the hair

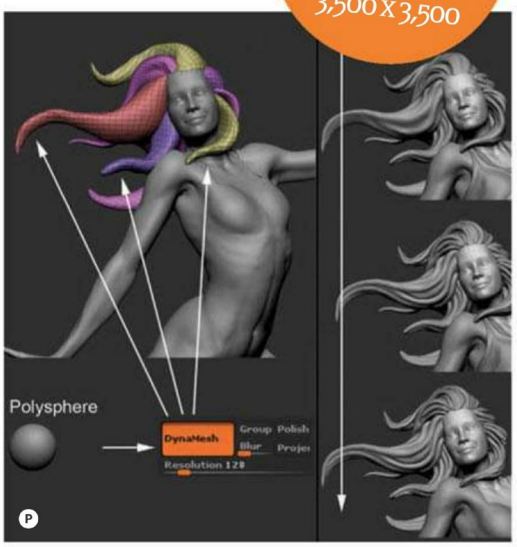
30 hours render time
Resolution: 3,500 x 3,500



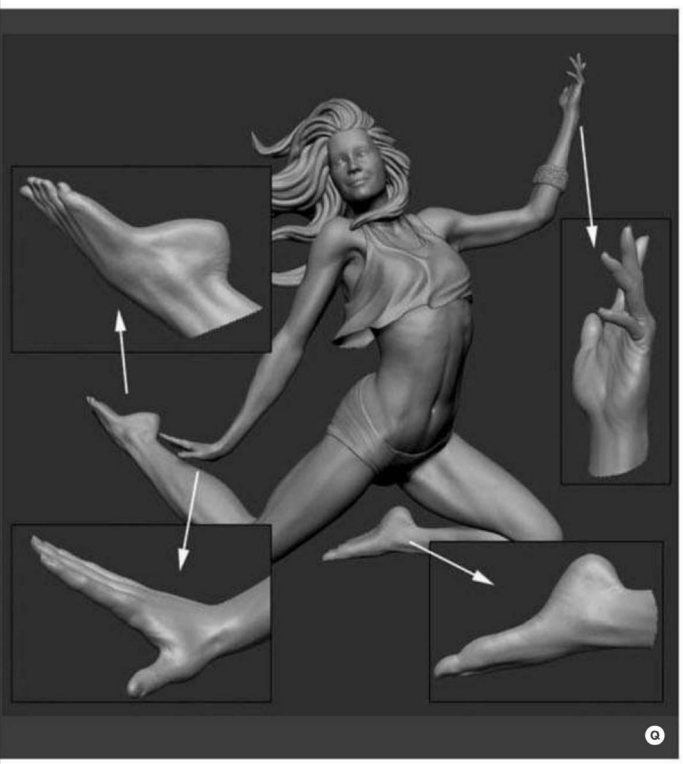
14 Morph the head into the sculpted mesh We now have two ZTools: one with the posed mesh and one with the head sculpted in symmetry. To transfer the head to the posed mesh we append the head ZTool as a SubTool of the posed mesh, switch it to the lowest subdivision level and use Transpose to roughly line up the head to the head of the posed mesh. Store a morph target for the posed mesh, then mask everything but the head of the posed mesh. Press the Project All button (SubTool palette) with the posed mesh selected and the head SubTool visible to transfer the head details to the posed mesh on the unmasked area. Now that you have the head details on the posed mesh, use the Morph brush to morph back in the neck and re-sculpt it where needed N.



15 Sculpt the smile After transferring the head back to the posed mesh, we lose the option to sculpt in symmetry, but all that's left is to add a smile to the face. We'll create a new sculpting layer and start to work with the Move tool from a lower subdivision level to higher ones to shape the smile. The mouth gets stretched so the lips lose a little volume and roll slightly inwards. The nasolabial fold gets marked when modifying the planes of the cheeks. Smiling involves more than just the mouth; eyes and part of the cheeks are involved as well. The movement can be subtle, but it's very important to achieve a believable smile O.



16 Model the hair To create the hair we append a Polysphere as a SubTool, then convert it to a DynaMesh with a resolution of 128. Using Transpose and Move we roughly put in place each strand of hair. Keep in mind that if the poly gets stretched you can always re-sculpt it using Cmd/Ctrl-click and drag, then release in an empty part of the canvas. Once happy with the shape of the strand, exit DynaMesh and start subdividing the mesh. Using the Clay Buildup brush, begin creating the broad volumes, then continue to subdivide and you will end up having enough subdivision to very finely sculpt thinner strands of hair P.



17 Finish the model The final steps are to refine the small details that are still missing. In the face we define a bit more of the eye area and add small wrinkles to the lips using the Dam Standard brush. Using the Clay Buildup and Dam Standard brushes we also sculpt wrinkles on the feet and hands. These body parts in particular need a lot of love because they can be very expressive. Having great references is very important – and you can always look at your own hands and feet! Try to not rush this step because it's fundamental to create a believable sculpture Q.

- N Using the Morph brush we transfer the head back to the posed mesh
- P Use the DynaMesh and Clay Buildup brushes to sculpt the shape of the hair
- Q Adding small details like wrinkles in the feet and hands really helps to create a believable sculpture

Rendering

To render the final passes we use the LightCap feature to create a lighting system based on an HDR image. In the LightCap tab of the Light palette you can import an HDRI file. ZBrush will analyse the file and create a dome of light based on the colour information of the image for you. You can then use a Standard material with the Wax modifier to 40 (remember to activate the Wax preview on the Render properties of the Render palette). Export a Beauty, an Ambient Occlusion and a Mask pass to composite everything in Photoshop. You can find the LightCap files supplied with this issue to help you perfectly light your character.

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Artist info

Pavel Kondratenko

Website www.texelstudio.com
Country Russia
Software used ZBrush, Maya, Photoshop
Bio Pavel specialises in modelling, texturing and creating shaders for films, commercials and games.

"To make the skin appear realistic I painted nine different textures. The main colour I painted in ZBrush and added some detail with Photoshop. I blended Displacement and Cavity maps with the main colour to create variation"

"I created the wrinkles in ZBrush by painting a mask on the cat's body, to which I applied the Inflate deformer twice and a little correction with Smooth and Dam Standard brushes. For small wrinkles, I used the Standard brush with an Alpha"

"To create hair I used the Shave And A Haircut Maya plug-in. For the growth of the hair, I copied the geometry of the cat, removed the parts where I didn't want any hair and also created a Density map in ZBrush"

Sphynx Cat 2012

The main point of this work was to study the SSS material in mental ray and to model wrinkles in ZBrush. The modelling part was rather quick. I mainly used ZBrush, including retopology work. Afterwards, all the models were imported into Maya where I set up the lights and the default materials for the skin, eyes, fabric and gold. The last step in 3D was the creation of the fur on the cat's body. To achieve this I used the Shave And A Haircut Maya plug-in. The final composition was made in Photoshop.

Software used in this piece

ZBrush Maya Photoshop

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Masterclass

Scott Eaton is a character supervisor and anatomy instructor. This Masterclass explores some of the fundamentals of anatomy for artists

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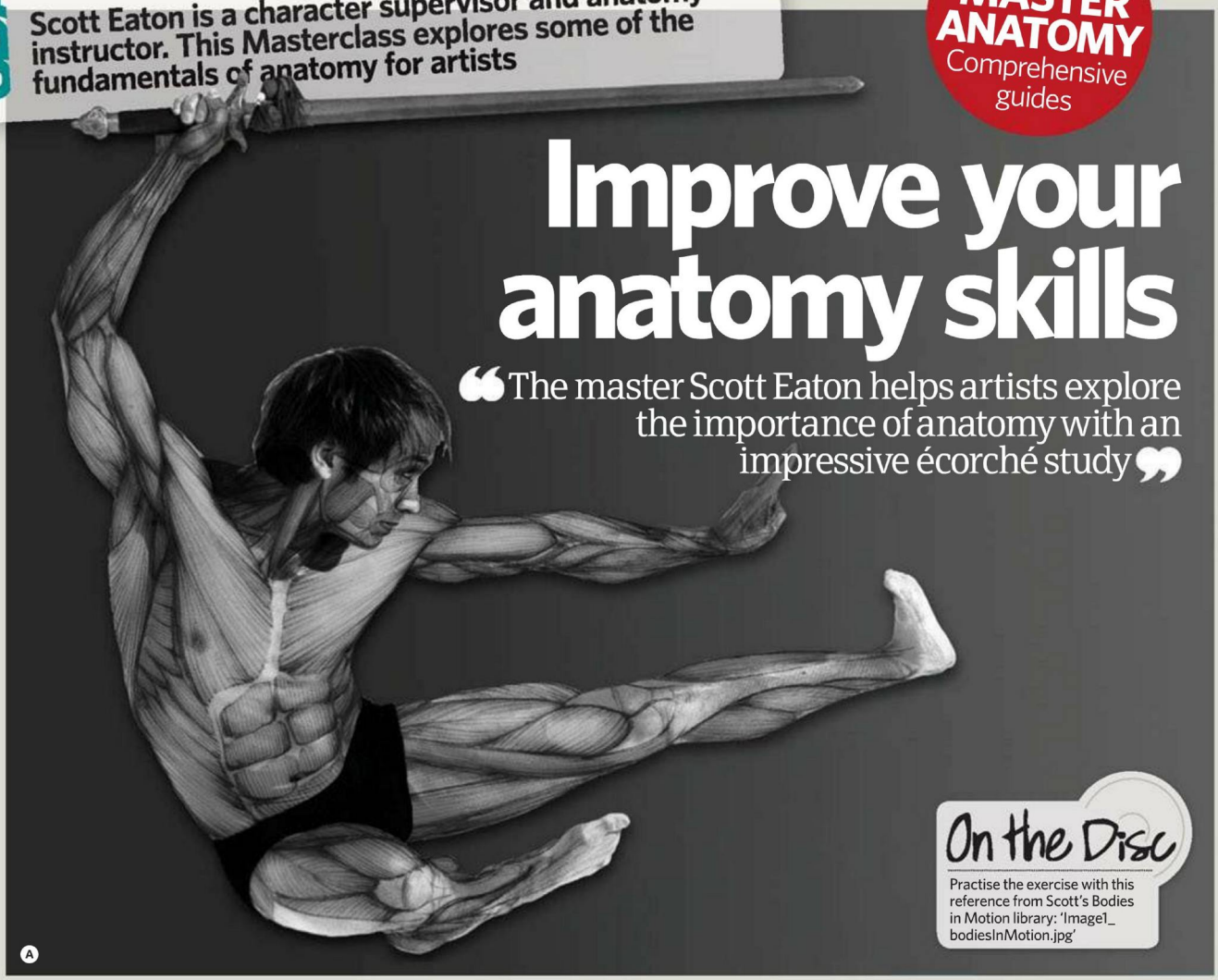
"The master Scott Eaton helps artists explore the importance of anatomy with an impressive écorché study"



On the Disc

Practise the exercise with this reference from Scott's Bodies in Motion library: 'Image1_bodiesInMotion.jpg'

Anatomy is fundamental, it's the foundation of figurative art and there is no topic more important. If you are a character designer, modeller, rigger, sculptor or illustrator, you must master this knowledge to be at the top of your field.

Every figurative artist at some point in their development reaches a point where they realise that in order to progress they have to deepen their understanding of anatomy. This Masterclass aims to give an overview of the complexity of the human body and teach a method for studying anatomy and learning from it.

Anatomical construction is certainly an investment of time and effort but there is a big payoff at the end – creating your work becomes faster, more creative, and more fun. Once you build your anatomical foundation each new figure is simply a variation on the structures that you already know. Certainly there are variations of proportion, development and musculature but the core construction is the same. With a sound knowledge of this construction you can focus your effort and attention on higher-level artistic goals like weight, balance, and gesture; the elusive artistic qualities that breathe life into a character.

The study technique I am going to describe in this article is called écorché drawing, or drawing without the skin. Artists have been using this method to study anatomy since the Renaissance. It teaches the structures of the body that directly influence its visible surface. This is exactly what we as artists are most concerned about.

The technique of écorché is simple. First choose your study image. Master drawings, classical sculptures and sports photography are all good options. Whatever you choose it should show enough muscular definition that you have something to study, and it should be lit in such a way as to give the forms roundness. Always try to avoid any flat lighting.

Once you have your image, simply create a layer for the skeleton/landmarks and a layer for muscles. If you are working on the computer this is easy enough; if you are working on paper, print your images out (as I am doing in this exercise) and use tracing paper to overlay. The hard part of course is filling the layers with accurate, well-investigated anatomy.

This is where the detective work begins. We explore the surface of the figure for evidence of skeletal landmarks, muscles, tendons and so on. This investigative process teaches us a lot about anatomy, we have to look closely at the figure to see what is creating form in each area and then identify it (usually with a long look through the plates of a good anatomy book). Finally we draw and label it. The important feedback loop in this process is carefully studying the anatomy plates and then relating it back to the forms we see in our image. Through this process we slowly learn how the underlying anatomy builds up

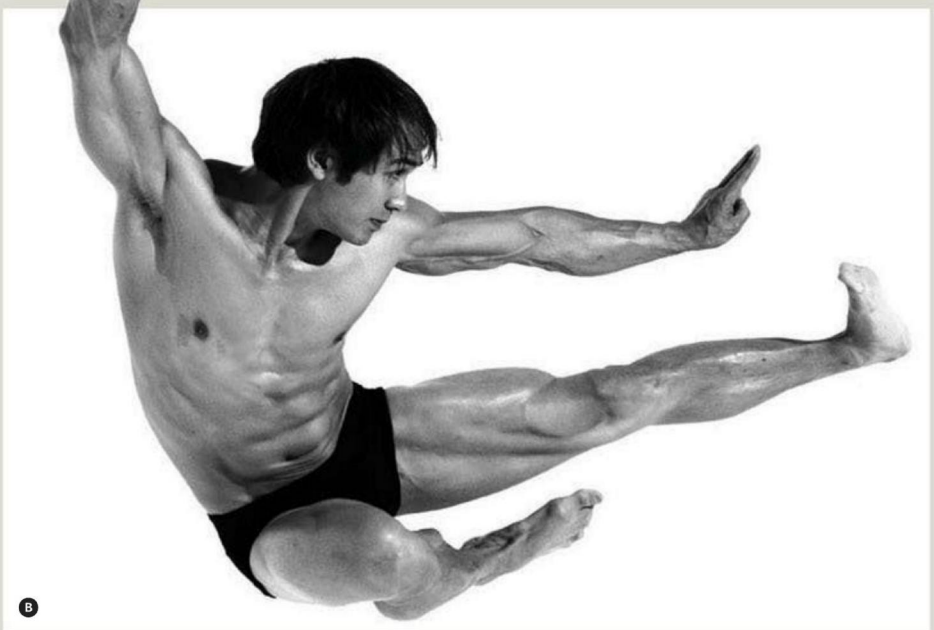
A Scott's final écorché composite features anatomically correct muscle definition

B This reference is from Scott's Bodies in Motion library. The image is dynamic, shows good definition, and is very well lit

C The écorché study: three layers of pen on tracing paper drawn over the printed reference image below

Studying the forms of the skeleton

The process shown here helps teach surface anatomy. This is critical, but it is also necessary for an artist to develop an understanding of the underlying skeletal structures. We don't need to know every detail of each bone, but we do need to know how the landmarks relate to the skeleton underneath. There are critical areas where it pays to study the forms of the skeleton: the pelvis, the ribcage, the elbows and the knees. It is good practice to draw or sculpt simplified versions of these areas to develop an artistic intuition for how they influence the surface from below.



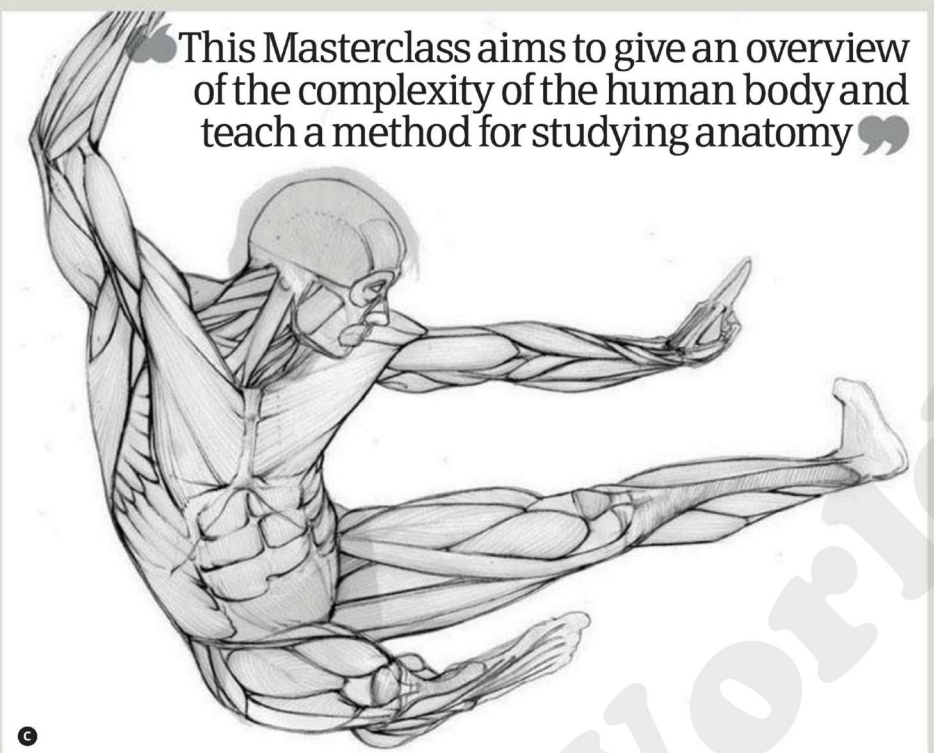
B

the surface of the figure. Over time this study accumulates the shapes and variations of muscles in our mental library and gives us freedom to work believably from our imagination.

To start our drawings, the first things we look for are skeletal landmarks. These are areas where the skeleton is subcutaneous, meaning right underneath the skin. These bony landmarks give us explicit locations that we can reliably use to locate and place surrounding muscles. Critical landmarks that we will investigate more closely below are parts of the pelvis (iliac crest, iliac spines), the clavicles, bony points of the elbows (epicondyles of the humerus) and more in the lower body. It is important to locate these first because they give us the anchor points for the muscles.

Once we have found our anchor points, we start to identify and place the muscles. If we have done a good job of locating our landmarks, part of this process is as easy as connecting the dots. With the muscles we look for the boundaries, the flow and the start and end point of the muscles (origins and insertions). Because we are working from outside inwards, not everything will be easily visible to us. Many times skin and fat hide much of what we are looking for, in this instance we have to use our x-ray vision to infer the underlying structure. As abstract as this may seem at first, this is not simply guessing, it's an informed process that uses the surrounding landmarks to guide the construction of the anatomy underneath the surface.

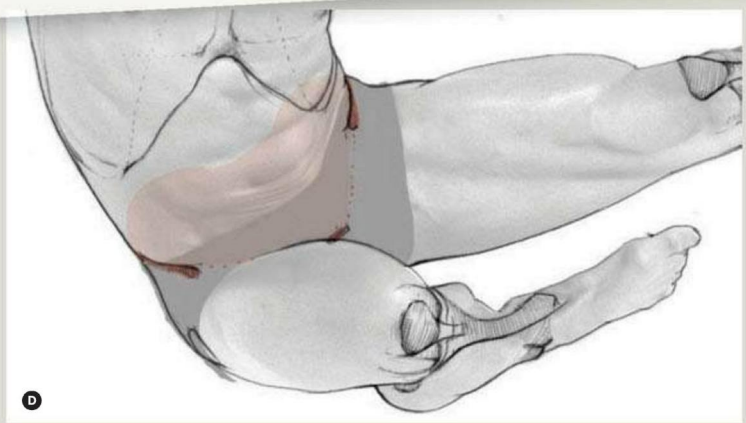
> "This Masterclass aims to give an overview of the complexity of the human body and teach a method for studying anatomy"



C

As you proceed through the following steps you should get a sense for the amazing complexity of the body. When everything is placed correctly the body fits together perfectly, like a puzzle. Each piece logically attaches to another and there is no space wasted. When things aren't correct there are spaces that are unaccounted for, too many muscles might converge to a single point, a muscle might taper until it has no thickness, any number of breakdowns can occur. These of course are part of the learning process.

In this tutorial I want to highlight the important anatomical considerations that went into completing this écorché study. Of course there is a lot more anatomical knowledge than I could ever hope to cover in a single article. For people interested in a complete understanding of artistic anatomy, and a lot of écorché practise, I refer you to my online anatomy courses where you'll find plenty to inspire and further your studies (www.scott-eaton.com). Now let's get started.



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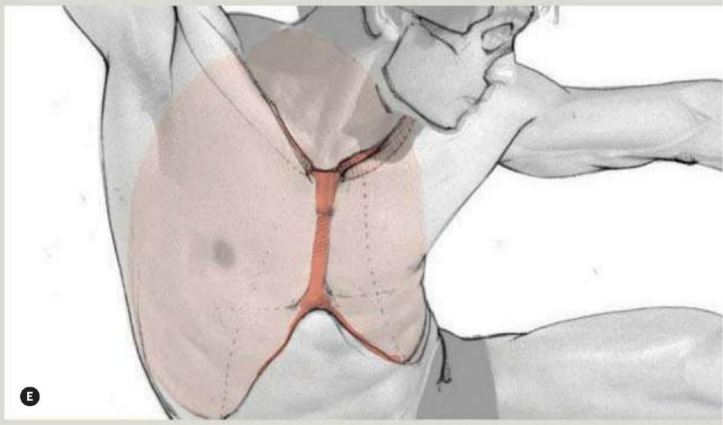

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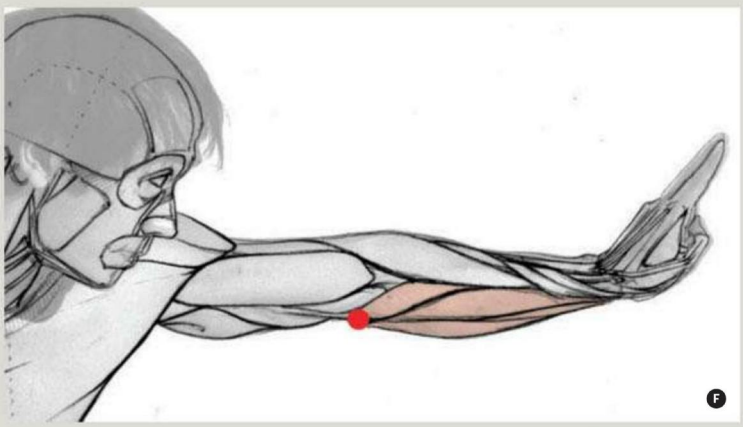

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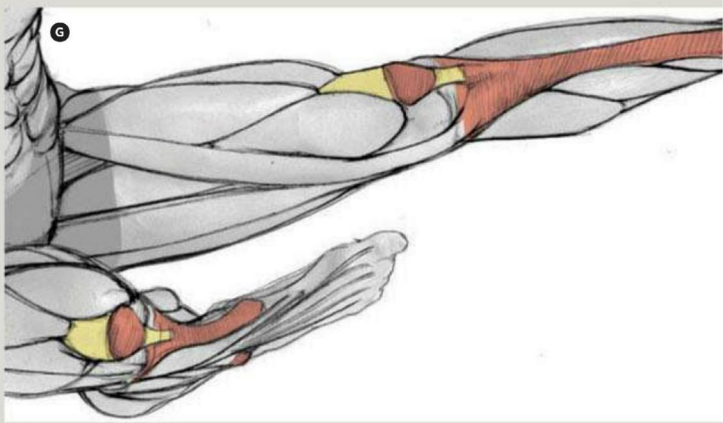

G

D Here we locate the critical landmarks of the pelvis

E The landmarks of the ribcage and clavicles locate the pectoral muscles

F The epicondyles of the humerus help place the flexor and extensor forearm muscles

G Understanding the construction of the knee is critical to find leg muscles

H External obliques run from pelvis to the fifth rib and shape the ribcage

Map out human anatomy

01 Landmarks of the pelvis

Let's start here: this is the core of the body and the best place to begin the construction. First we find and mark the two bony prominences at the front of the pelvis – the anterior superior iliac spines. These are magic points that help use find the crest of the pelvis (iliac crest). This serves as a good dividing line between the torso and legs. We don't need to draw the entire pelvis, but it's important to locate these landmarks D.

02 Landmarks on the torso

Moving up from the pelvis we find and mark the sternum and the clavicles. Both of these landmarks are going to be anchor points for the pectoral muscles, as well as one of the big muscles of the neck. The important thing to appreciate here is the orientation or elevation of the clavicles. In this pose, with the arms raised, the pectoral muscle covers much of the anterior surface of the bone E.

H

Origins, insertion and direction of pull

The anchor points of a muscle onto bone are called its origin and insertion. It is convention to call the more fixed of the two anchor points the muscle's origin, and the end that gets articulated the insertion (though the muscle itself contracts uniformly and doesn't have any idea of direction). These attachment points come in many shapes and sizes, each having different mechanical advantages. Some are small, tight, tendinous attachments, others are broad, diffused and fan-like. The pectoralis major is a good example of broad origin giving a strong focused pull on a narrow insertion (see Step 6).

03 Landmarks located on the elbows

In this pose we only have a view of the inside of the arms, so the major landmark we are looking for is called the medial epicondyle of the humerus (known to some as the funny bone because the ulnar nerve passes dangerously close to it and is easily impacted). This landmark is found at the elbow and is the origin for the flexor muscles of the forearm. An outside view would show the lateral epicondyle, the anchor point for the extensor muscles of the forearm. Forearm muscles are especially complex, but these landmarks are critical for building starting points F.

04 Key landmarks to look for on the legs

The big landmark for us here is the patella. This bone helps to route the force of the quadriceps muscles to the tibia on the lower leg. The shape of the patella is very important, but so is the form of the quadriceps tendon that attaches into it from above. Learning the shape and construction of both will give you the ability to make convincingly functional knees. As we descend down from the knee into the lower leg, the entire anterior surface of the tibia is a superficial landmark as well as the medial anklebones (malleolus) G.

05 Abdomen muscles

Using the iliac crest (marked in Step 1) as our starting point we can place the external

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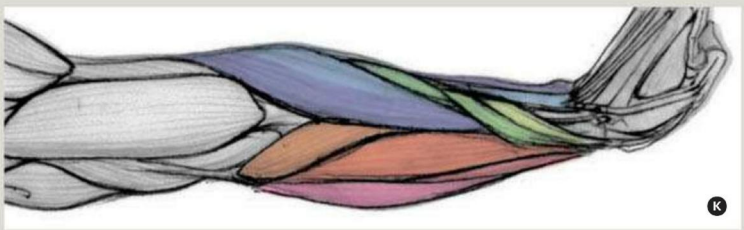
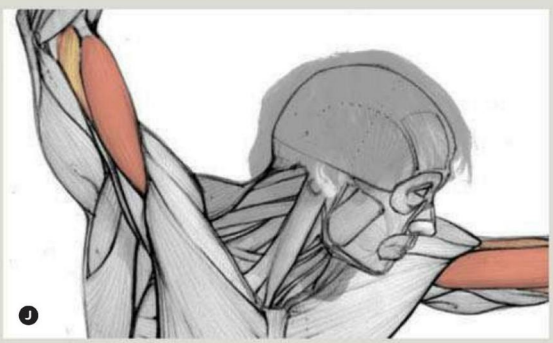
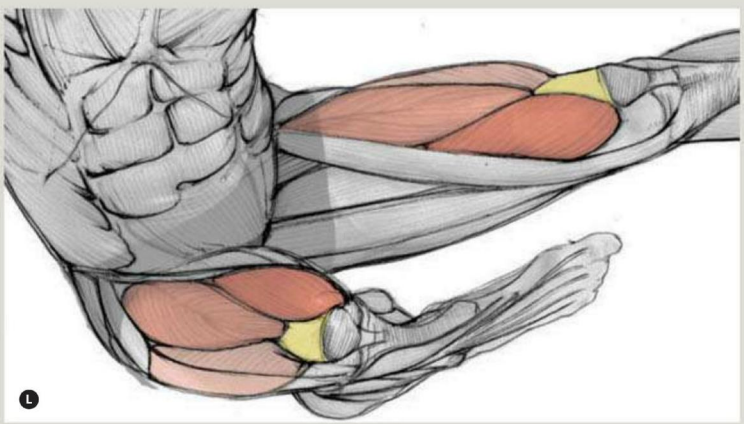






Anatomical terms worth learning

I try to use the correct anatomical names when teaching artists anatomy. Not only is it important to share a common language when describing the body, but also it is necessary to know this terminology in order to study from anatomy books. Most people get lost in the naming and nomenclature and this puts them off studying anatomy. In this article I frequently use the anatomical names for direction/orientation relative to the centre line of the body:

- Anterior/Posterior: in front, behind
- Superior/Inferior: above, below
- Medial/Lateral: towards the centre, away from the centre

I The shape of the pectoralis major changes vastly when the shoulder articulates slightly

J The brachialis is the lesser-known, but still important, flexor of the elbow

K These muscles mass near the elbow and pass their contractile force down the long tendons

L The quadriceps each exert distinct directions of pull on the patella based on which way up they are

M A fitting finish: This is Scott's favourite muscle of the whole body – the sartorius

obliques up both sides of the torso. This muscle helps twist the body at the waist and also flex it forward. In this pose one side of the muscle is contracted and one side is stretched. This action creates a large variation in how the muscle appears. The contracted side shows defined finger-like digits, the stretched side is pulled thin and enables the form of the ribcage to show through on the body's surface H.

06 The pectoral muscles of the chest

The hero muscle of the torso is undoubtedly the pectoralis major muscle. The important thing to understand here is that the muscle has three distinct origins. These origins are across the inner two-thirds of the clavicle, the height of the sternum and then across the top of the abdomen. Be sure to show the three different bodies as they converge and insert onto the humerus over top of the biceps but underneath the deltoid. This interlocking of muscles between each other is critical for the mechanical function of the body I.

07 Flexors of the elbow

In our view of the inside of the arm we can separate the muscles of the upper arm into functional groups, extensors (the triceps) and flexors of the elbow. We probably all know the biceps is the primary flexor of the elbow, but a second flexor called the brachialis sits underneath the biceps. This muscle visibly squishes out near the elbow on the inside of the arm and is also visible on the outside of the arm just behind the biceps and immediately below the insertion of the deltoid J.

08 Extensors and flexors of the forearms

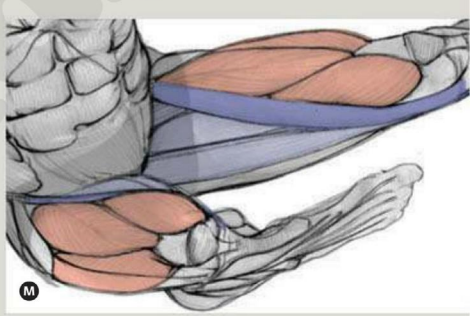
As I mentioned when we located our epicondyles earlier, the forearms are very complex. On the surface there are approximately 14 long thin muscles to place. This is a big task but once you understand the construction and mechanics of what the muscles do, it all proceeds very logically. The muscles coming off the lateral epicondyle extend the wrist on the radial and ulnar side (the thumb and pinky side respectively) and extend the fingers. From the medial epicondyle we have muscles that flex the wrist on both side and flex the fingers K.

09 Quadriceps in the upper portion of the legs

Working our way down to the legs, the most prominent muscles we encounter are the quadriceps. The name implies four muscle bodies, but only three are commonly visible (the fourth is hidden underneath the others). The important construction to show here is the teardrop-shaped vastus medialis (the big, inner head) coming down to touch the patella on the medial side. The remaining two quadriceps muscles always use a length of tendon to attach into the patella (hence the importance of the quadriceps tendon mentioned in Step 4) L.

10 Adductors and Sartorius

When looking at the legs in this image it is hard to ignore the long graceful curve of the sartorius muscle. This muscle passes just behind the quadriceps on the inside of the leg creating a useful boundary between the quadriceps and the adductors (the collection of muscles that pull the legs inward). The sartorius is the longest muscle in the body, be sure to originate it at the anterior superior iliac spine and flow it all the way down to the inside of the tibia below the knee M.



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Back to basics

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Realistic character rigging

"In this tutorial we will cover the creation of a joint structure for a biped character and its importance in getting good deformation"

Joint placement is the most important part of creating a rig. The majority of a character's deformation comes from the translation and orientation of joints, so without good joint placement, you could be setting yourself up for hard work later on in the form of shape fixers to remedy local problems. The idea is that the better your joint placement, the simpler, cleaner and more effective the whole process becomes.

This tutorial will explain how to create the skeleton for a biped character. We will mainly be focusing on joint placement, but throughout the process we will be adhering to some key rigging principles. So by the end of the ten steps, you will be able to create skeleton structures for any realistic biped character, though the concepts can easily be transferred to other types of characters such as quadrupeds or more cartoon-like characters.

When considering realistic characters, it's vital that our rigs are based on anatomy; we are trying to replicate the articulation of the human body, so anatomical reference is the key to believability. There may be occasions where we stray away from the reference – for example, we will reduce the number of joints in the spine – the reason for this is to simplify wherever possible, without sacrificing credibility. In the scene files provided, there is a skeletal structure that has been placed within the body to help position the joints, which is a technique that is very useful, whether rigging realistic or cartoon characters.

At the outset planning is essential, so it's a good idea to take front and side images of your model and sketch over them. Think about the following questions: How many joints are there? Where should they go? What kind of spine do you need? Will you need any shot-specific rigs? Be as thorough at this stage as you can.

For this particular example we'll be creating what is known as a broken hierarchy rig. The body will be divided up

A A rendered image of a series of poses using the final rig

B A draw-over to help figure out where to place the different joints

C The rig in a quick pose using IK handles to keep the feet planted

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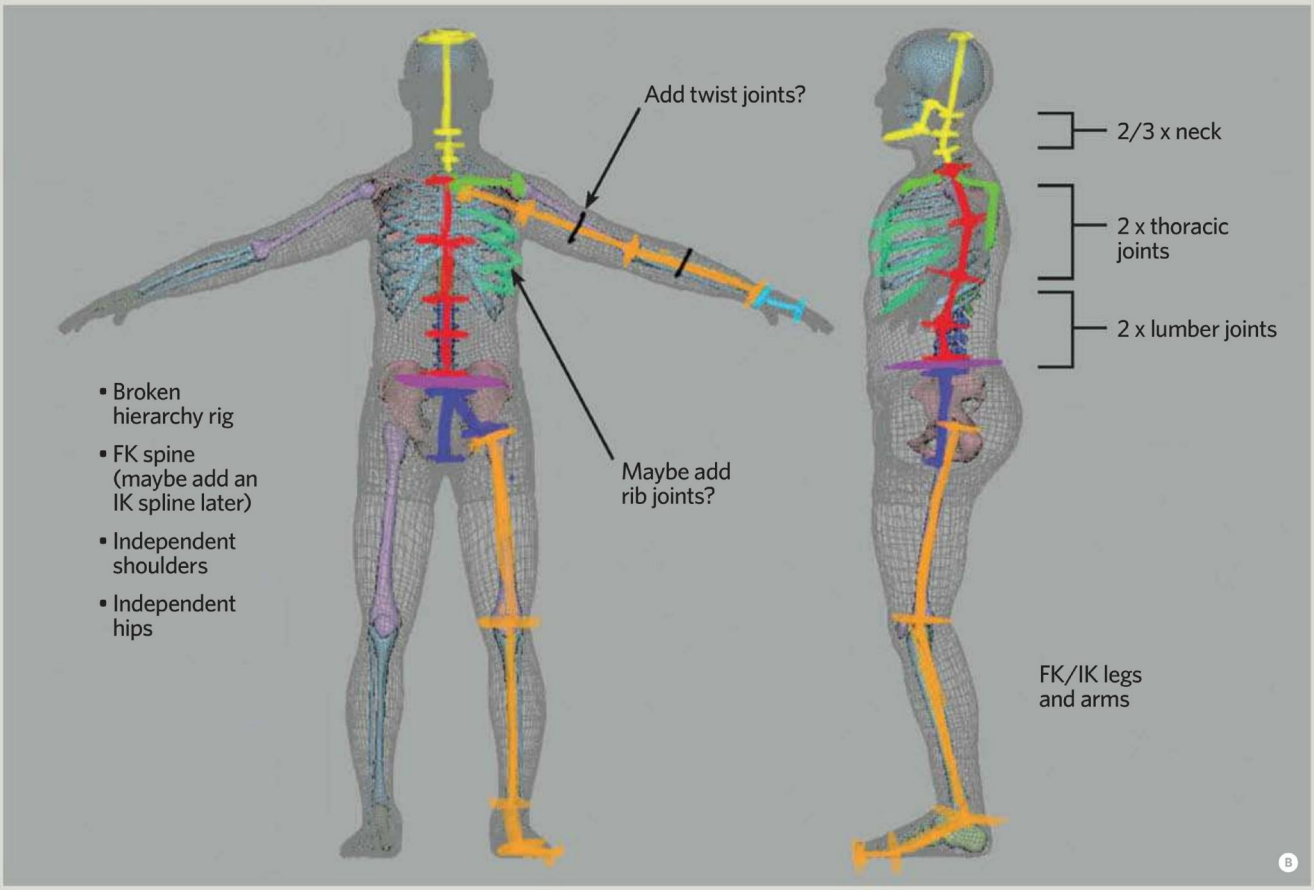


into segments, namely the torso, neck and head, arms, legs and finally hands. The body will later be fused together using orient and point constraints. The reason for this approach is first to make the rig more manageable and more easily editable, simply because each part is smaller and separate. Also, by having the ability to turn the weighting of the orient constraints on and off, we can play more freely with the behaviour of each segment, which can produce interesting results.

Throughout the process we shall be setting ourselves some guidelines to maintain consistency in the rig. First, it will be desirable to have the Rotate Z as the forward-driving motion for each joint, using the Orient Joint tool. By so doing, the animation curves on the graph editor will be easily understood by an animator. Second, to position the joints, we can translate in X, Y and Z for the parent joint of the joint chain, but for all children joints we will only use the Translate X, which is also the length of the joint. To rotate the joints, we will use Joint Orient in the Attribute Editor in order to keep the Rotate channels and Translate Y and Z at 0, enabling an easy passage back to the creation pose. Last, it's advantageous to use naming conventions, as these will help others to read and navigate through your scenes more easily. For example, we will use the suffix _jnt for all joints and _geo for all geometry. Although we will, for the majority of the time, try to stick to these guidelines, there will be times when we will have to bend these rules also. One example will be for the positioning of the scapula joint. As we will want to maintain the orientation values for this joint, we will translate both the parent and the child joint to position it.

A final point with respect to joint creation is to ensure that joints are drawn in orthographic (front, side or top) views, but are positioned in all views including the perspective. This technique will help achieve correct placement and will also enable joints to be mirrored over more accurately, saving time later on.

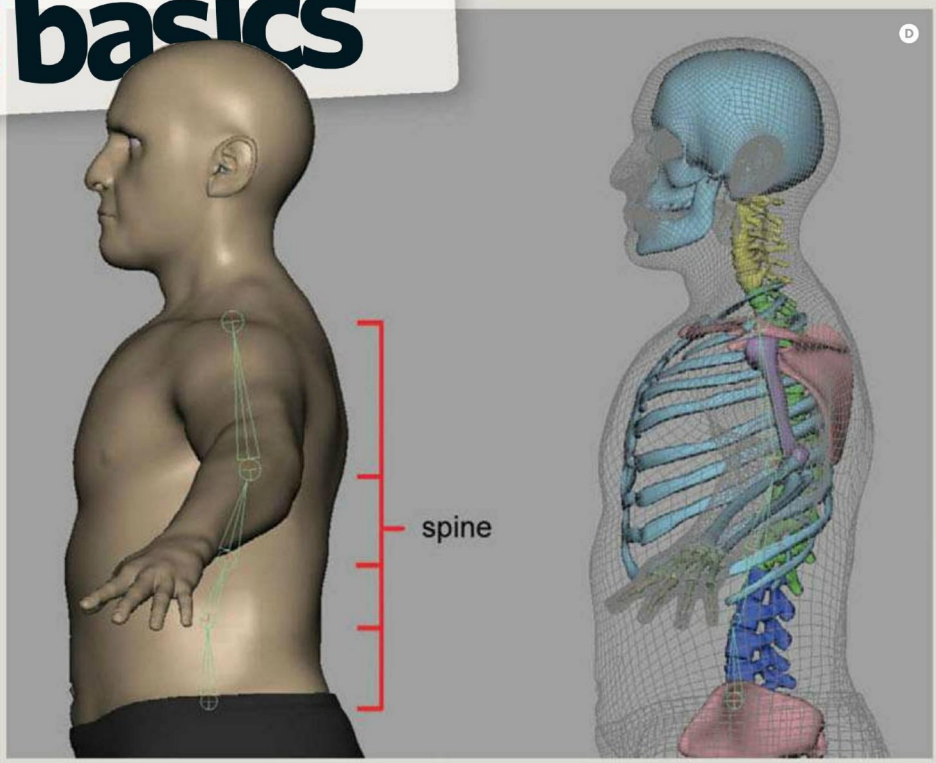
For this tutorial, we will only be creating the skeletal structure for the rig. This initial step can be developed by adding a control rig with features such as FK/IK blending and reverse foot setup, which will make it more suitable for animators. The first step of the tutorial will be to focus on the torso, as it is the central and main driving force of the character and therefore needs to be as accurate as we can make it.

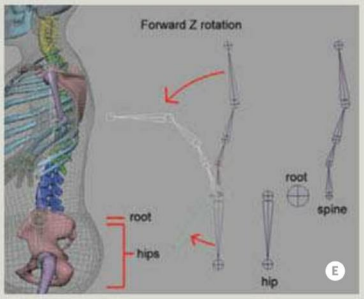
Let the rigging commence

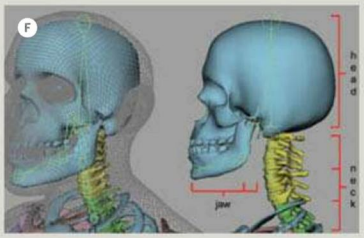
01 Create the spine

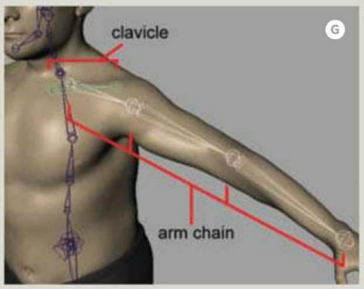
Open up scene file '01_start.ma' and, in the Animation panel, navigate to the Skeleton>Joint Tool. Go into the side view and create a five-joint chain that follows the curvature of the spine starting from around the belly button. Rename the joints from the root to the tip, as follows: 'spine_a_jnt', 'spine_b_jnt', 'spine_c_jnt', 'spine_d_jnt' and 'spine_end_jnt'. Select spine_a_jnt and go to Skeleton>Orient Joints (Options), set Orientation to XYZ and Second World Axis to +Z. Make sure Orient Child Joints is checked on and hit Apply. Select the spine_end_jnt, go to Skeleton>Orient Joints and set the Orientation to None D.

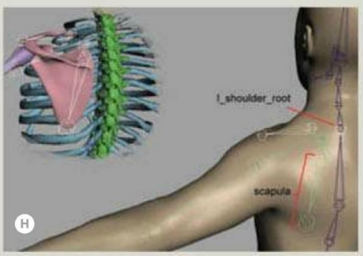
Back to basics











D A side view breakdown for the spine

E Highlight the independent spine and torso

F A perspective and side view of both the neck and jaw chain

G A breakdown of the arm and clavicle chain positioned using Joint Orient and Translate X tools

H The scapula joints in position

I Checking the consistent behaviour in the orientation of the leg joints

J Creating the finger joints

02 Root and hips

Using the Joint tool, create a single joint in the side view and hit Enter. Rename the joint 'root_jnt' and increase its Radius in the Channel box to make it larger. Holding down the V key, point snap the root_jnt to the same position as the spine_a_jnt. Next go back into the Joint tool and create a two-joint chain for the hips. You can point snap the start of this chain to also begin at the root joint. Rename the new chain 'hip_jnt' and 'hip_end_jnt'. Using the Orient Joint tool, change the orientation of the hip joint so its Positive Z rotation opposes the spine rotation. Parent spine_a_jnt and hip_jnt under root_jnt E.

03 Neck and head

In the side view, create a five-joint chain for the neck and head. Begin the chain by holding down the V key and point snapping to the spine_end_jnt. You should draw three joints for the neck, one for the head and an end joint. Rename the joints from root to tip: 'neck_a_jnt', 'neck_b_jnt', 'neck_c_jnt', 'head_jnt' and 'head_end_jnt'. Again, in the side view, create a three-joint chain for the jaw. Rename these joints: 'jaw_a_jnt', 'jaw_b_jnt' and 'jaw_end_jnt'. Use the Orient Joint tool to make their behaviour consistent to the spine. Parent the jaw_a_jnt under head_jnt F.

04 Arm and clavicle

Move into the front view and create a four-joint chain starting close to the centre of the body, travelling down the arm to the wrist. Rename the joints: 'l_shoulder_jnt', 'l_upper_arm_jnt', 'l_lower_Arm_jnt' and l_arm_end_jnt'. Use the Joint Orient and the Translate X of each joint to position the arm correctly, making sure to check in all views. Also, in the front view, create a two-joint clavicle chain using the geometry as a guide. Rename the joints: 'l_clavicle_jnt' and 'l_clavicle_end_jnt'. Once both chains have been positioned, make sure to set the Orientation to XYZ with a Second World Axis of +Z in the Orient Joint tool. Select the l_arm_end_jnt and set its Orientation to None using the same tool G.

05 Shape the scapula

Select the l_shoulder_jnt and duplicate it. Translate it back slightly onto the scapula geometry and delete the elbow joint on that new chain. You should now be left with a two-joint chain. Rename them 'l_scapula_jnt' and 'l_scapula_end_jnt'. For the scapula, we want to leave the orientation as it is so we can drive it using the l_shoulder_jnt. To position it, just translate both joints to sit within the scapula geometry. Parent the l_scapula_jnt to l_shoulder_jnt. Now select spine_end_jnt and duplicate it twice. With both selected, hit Shift+P to bring them out from their current hierarchy. Rename the two joints 'l_shoulder_root_jnt' and 'r_shoulder_root_jnt' H.

06 Leg joints

In the side view, create a five-joint chain starting at the femur bone and ending at the tip of the toes. Rename the joints as follows: 'l_upper_leg_jnt', 'l_lower_leg_jnt', 'l_ankle_jnt', 'l_ball_jnt' and 'l_toes_jnt'. Move into the perspective view and move the l_upper_leg_jnt into place. Again, using the Translate X and the Joint Orient of each joint, translate and orient the joints into

Avoiding Gimbal Lock

Gimbal Lock is the result of two axes sitting on top of each other and therefore both producing a similar rotational result. To see the effects of this, double-click the Rotate tool to open up its settings and change the Rotate Mode to Gimbal. Select the l_upper_arm_jnt and rotate it in negative Y. You will find that the Z and X axes overlap as we have gone into Gimbal Lock. With the l_upper_arm selected, go into the Attribute Editor and change the Rotate Order to ZXY. Orient the arm again and you will find that you no longer hit Gimbal Lock using the Rotate Y.

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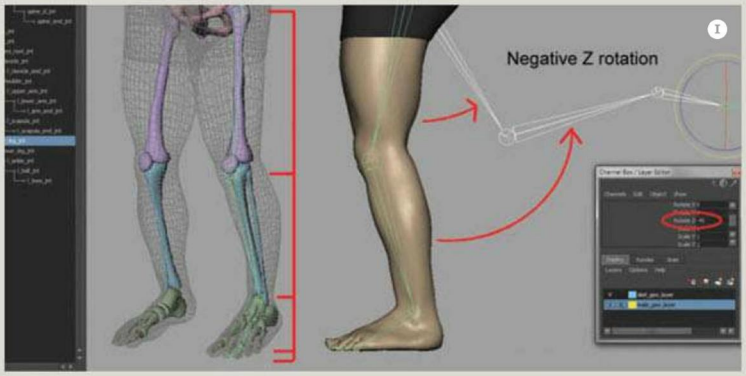
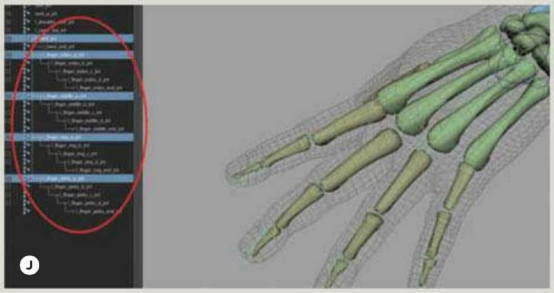
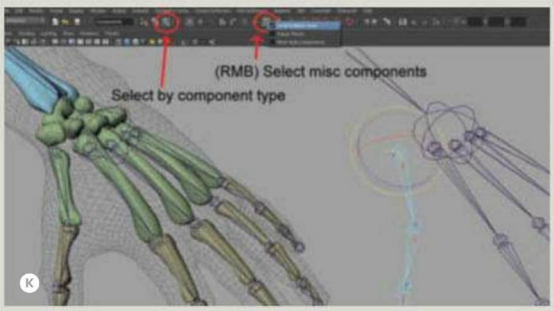






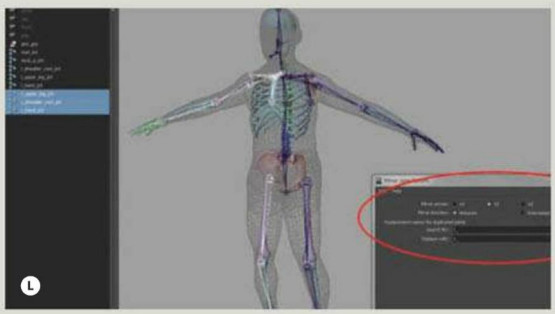
Cleaning up the rig

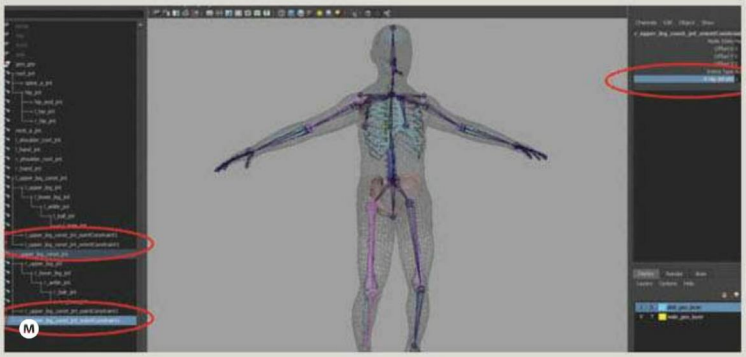
It's important that should anyone else need to continue with the rig that they are able to understand how things have been structured and set up. I like to create groups for each section of my rigs. For example, we could group together root_jnt and neck_const_jnt and call that group 'torso_rig_grp'. We could also select both leg chains and group them together, calling that group 'leg_rig_grp'. We could then take these new groups and group them all under one group and call that 'rig_grp'.

K Component By Type and Local Rotation Axes

L The Mirror Joint settings used

M The weighting for the orient constraints





position using the skeleton as a guide. Select l_upper_leg_jnt and use Skeleton>Orient Joints with the Orientation set to XYZ and the Second World Axis set to +Z. Select the l_toes_jnt and use the tool again, only this time set Orientation to None I.

07 Hands and fingers

Select the l_arm_jnt and duplicate it. Un-parent it from its current hierarchy and rename it: 'l_hand_geo'. Duplicate l_hand_geo and use Translate X to slide it towards the end of the palm. Rename the duplicated joint: 'l_hand_end_jnt' and parent it under l_hand_jnt. Go into the top view and draw a five-joint chain along the pinky finger. Rename the joints: 'l_pinky_a_jnt', 'l_pinky_b_jnt', 'l_pinky_c_jnt', 'l_pinky_d_jnt' and 'l_pinky_end_jnt'. Use the methods mentioned earlier, position and orient the joints into place. Once the pinky finger is done, duplicate it and replace the word 'pinky' with 'ring'. Again, position and orient the joints to sit in the ring finger geometry. Do this for all the remaining fingers J.

08 Thumbs

In the top view, draw a four-joint chain along the thumb and rename the joints. Position and orient the joint into place. To curl the thumb inwards using only the Rotate Z, we will manually edit its orientation. In the Status Line toolbar, click the Select By Component Type button. Then Ctrl/right-click over the question mark icon (select miscellaneous components) and check Local Rotation Axes. You can now select the thumb joints and, using the Rotate tool, orient the joints manually. When you are happy with how the thumb rotates using only the Z axis, click the Select By Object Type button to come out of Component mode. Now parent all the finger and thumb _a joints to l_hand_jnt K.

09 Mirror the joints

Select l_upper_leg_jnt and go Skeleton>Mirror Joints (Options). Set Mirror across to YZ, set Mirror Function to Behaviour, search for: l_ and replace with: r_ then hit Apply. Repeat this step for l_shoulder_jnt, l_clavicle_jnt and l_hand_jnt. Parent l_shoulder_jnt and l_clavicle_jnt under l_shoulders_root_jnt. Do the same for the right shoulder. Select neck_a_jnt and duplicate it. Delete all the child joints and rename the single joint 'neck_const_jnt'. Parent neck_a_jnt under neck_const_jnt. In the Outliner, select spine_end_jnt, hit Cmd/Ctrl, select neck_const_jnt, go to Constrain>Point then Constrain>Orient. Now select l_hand_jnt and duplicate it. Delete all of its children and rename that single joint 'l_hand_const_jnt' L.

10 Constraints continued

Parent l_hand_jnt under l_hand_const_jnt. In the Outliner select l_arm_end_jnt, Cmd/Ctrl-click l_hand_const_jnt and go to Constrain>Point then Constrain>Orient. Next select l_shoulder_root_jnt, duplicate it and delete all the children. Rename the joint 'l_shoulder_const_jnt'. Parent l_shoulder_root_jnt under l_shoulder_const_jnt. Select spine_end_jnt, Cmd/Ctrl-click l_shoulder_const_jnt, go to Constrain>Point and then Constrain>Orient. For the leg, select l_upper_leg_jnt and duplicate it twice. Delete all the children in both new joint chains to leave two single joints. Rename them 'l_hip_jnt' and 'l_upper_leg_const_jnt'. Parent l_hip_jnt under hip_jnt. Parent l_upper_leg_jnt under l_upper_leg_const_jnt. Select l_hip_jnt, Cmd/Ctrl-click l_upper_leg_const_jnt, go to Constrain>Point and then Constrain>Orient. Make the exact same alterations for the right-hand side of the rig. Finally parent the skeleton geometry to its relevant joint. Give everything a last check over to ensure everything is correct, then you should be ready to test out the rig M.

3DArtist Questions & answers

Welcome to the Q&A section where we answer all of your technical quandaries on the most popular 3D programs including Maya, Houdini, ZBrush and Unity

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Gustav Melich
www.melich.org

Gustav is a Houdini artist with over 10 years of experience in VFX. He is ever in search of new and exciting solutions for all kinds of technical problems.

Maya

Create realistic lighting

On the Disc

Learn more about linear workflow rendering strategies in Maya with a detailed tutorial from Digital-Tutors on the disc

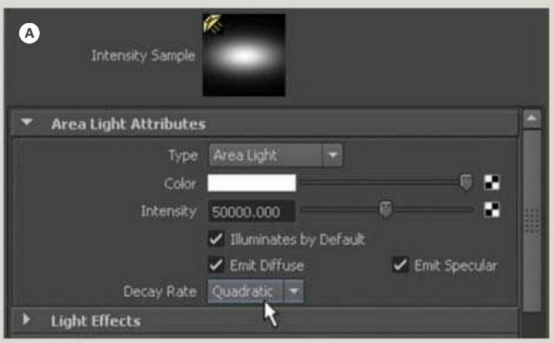
"How do I set up a linear workflow in Maya?"

When rendering with mental ray in Maya, adopting a proper linear workflow can drastically improve your lighting results. So before we answer the main question of this article, let's start with the first question you're likely to have: Why is a linear workflow important?

First, what you see on your computer monitor is a lie. The human eye can perceive a range of luminosity values far beyond anything that can be displayed on a standard computer monitor. So to compensate, most common image file formats (JPEG, BMP, TGA, PNG) contain special gamma-encoding information that enables the monitor to display the image in a way that looks correct to our human eyes. However, some special file formats such as EXR, HDR, or 32-bit TIFF files do not contain gamma-encoding information. These images are being displayed in a linear format.

If you've ever tried to open a linear image such as an HDR or an EXR file in a simple image viewer, you've probably noticed that the image looks overly dark, and may also have very blown-out highlights. There's nothing wrong with the image itself, it simply doesn't contain the gamma information that enables it to be displayed properly on your monitor.

This concept of gamma-encoding is what lies at the heart of a linear workflow. Believe it or not, whenever you render an image in Maya, the image that is displayed in the Render View does not have gamma encoding applied. As a result, renders will typically contain areas with overly dark shadows coupled with overly bright highlights in other parts of the image. By adopting a linear workflow, you ensure that the rendered lighting results are being displayed properly on your screen, which usually provides a huge leap in realism. This can help a range of different projects achieve far more impressive results.



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ZBrush
Kurt Papstein
http://kptoons.blogspot.com

Kurt Papstein has been working as a character/concept artist in games for the past five years. He's currently working as a character artist at Turtle Rock Studios.

Unity 3.5.2
Roald Høyer-Hansen
www.rockandroald.net

A former Unity employee, Roald is now living the dream as a freelance 3D artist during the day and levelling up in *Battlefield 3* in the evenings.

Send us all of your 3D problems and we'll get them sorted. There are four methods to get in touch with our team of expert advisors...

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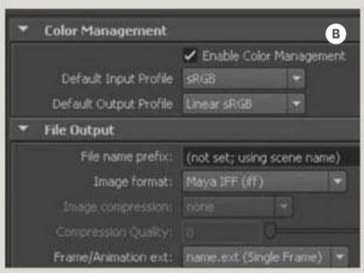


Incorporating a proper linear workflow into your renders doesn't necessarily involve repeating the lighting for your scene, but it does rely heavily on the process of gamma correcting any textures or materials that are used in your scene. Newer versions of Maya have a feature called Color Management that makes this process a bit simpler, but it still involves several steps.

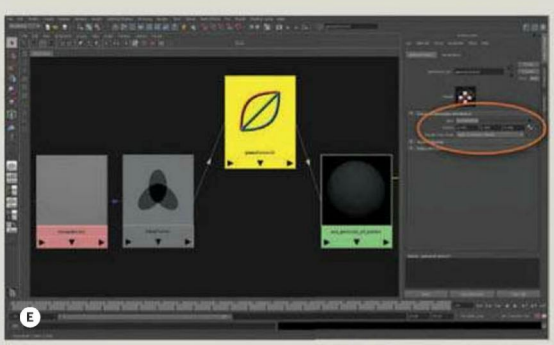
In this short explanation we'll walk you through the essential steps of setting up a linear workflow in Maya. Included will be some important bits of information that you'll need to keep in mind as you begin to incorporate a linear workflow into your everyday projects.

01 Use real-world values

When trying to create realistic lighting results in your renders, one of the most effective – if slightly obvious – steps you can take is to use real-world lighting values. Alter your Maya characters and environments up to match their real-world scale (each grid unit in Maya equals one square-centimetre in real-world size). Always make sure your lights are using a Quadratic Decay Rate, which ensures that the light energy decays exactly as it would in a real-world environment A.

02 Use Color Management

In the Render Settings window, set mental ray as the rendering engine and enable the checkbox for Color Management. Leave the Default Input Profile set to sRGB and leave the Default Output Profile set to Linear sRGB. In the Render View, go to Display>Color Management, which opens the Color Manager Attributes. Set the Image Color Profile to Linear sRGB, and set the Display Color Profile to sRGB B.



03 Understand gamma correction

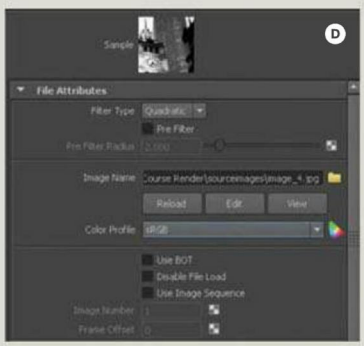
Remember that all the textures and material colours in your scene have already been gamma corrected to look accurate on your monitor. By applying gamma correction to an image that already contains gamma-corrected textures, you've essentially doubled the gamma in those areas. The result will be very bright, washed-out textures and colours in your render. We'll learn how to fix this problem in the next step C.

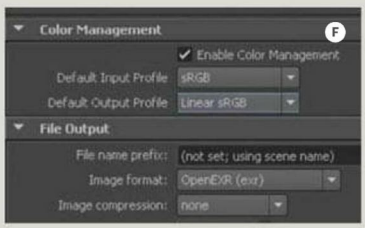
04 Set the Color Profile of your textures

To avoid the double-gamma issue, it's important that you set the proper Color Profile for your textures. The Color Profile option can only be found on the 2D File texture node. Any textures used as Colour or Diffuse maps should always have their Color Profiles set to sRGB. Any textures used as Bump maps, Normal maps, Displacement maps, or Transparency maps should have their Color Profiles set to Linear sRGB D.

05 Gamma correct colour swatches

Procedural textures and colour swatches in Maya do not have a Color Profile option, but these textures must still be gamma corrected. This can be accomplished by using a gammaCorrect node in Maya. Simply plug your procedural texture or colour swatch into the Value of the gammaCorrect node, then set the node's Gamma value to 0.45. You can now plug the gammaCorrect node into your material. Repeat this process with all procedural textures and any Diffuse colour swatches on your materials E.





Color Profiles in Maya

The Color Profile of a texture in Maya is tied to the Color Management settings in the Render Settings window. If you set the Color Management Default Input Profile to sRGB, Maya thinks the textures in the scene are in sRGB format. Any textures that are being used as Diffuse or Colour maps should have their Color Profile set to sRGB. If the Default Input Profile is set to Linear sRGB, then Maya assumes that all textures in the scene are Linear sRGB format by default.

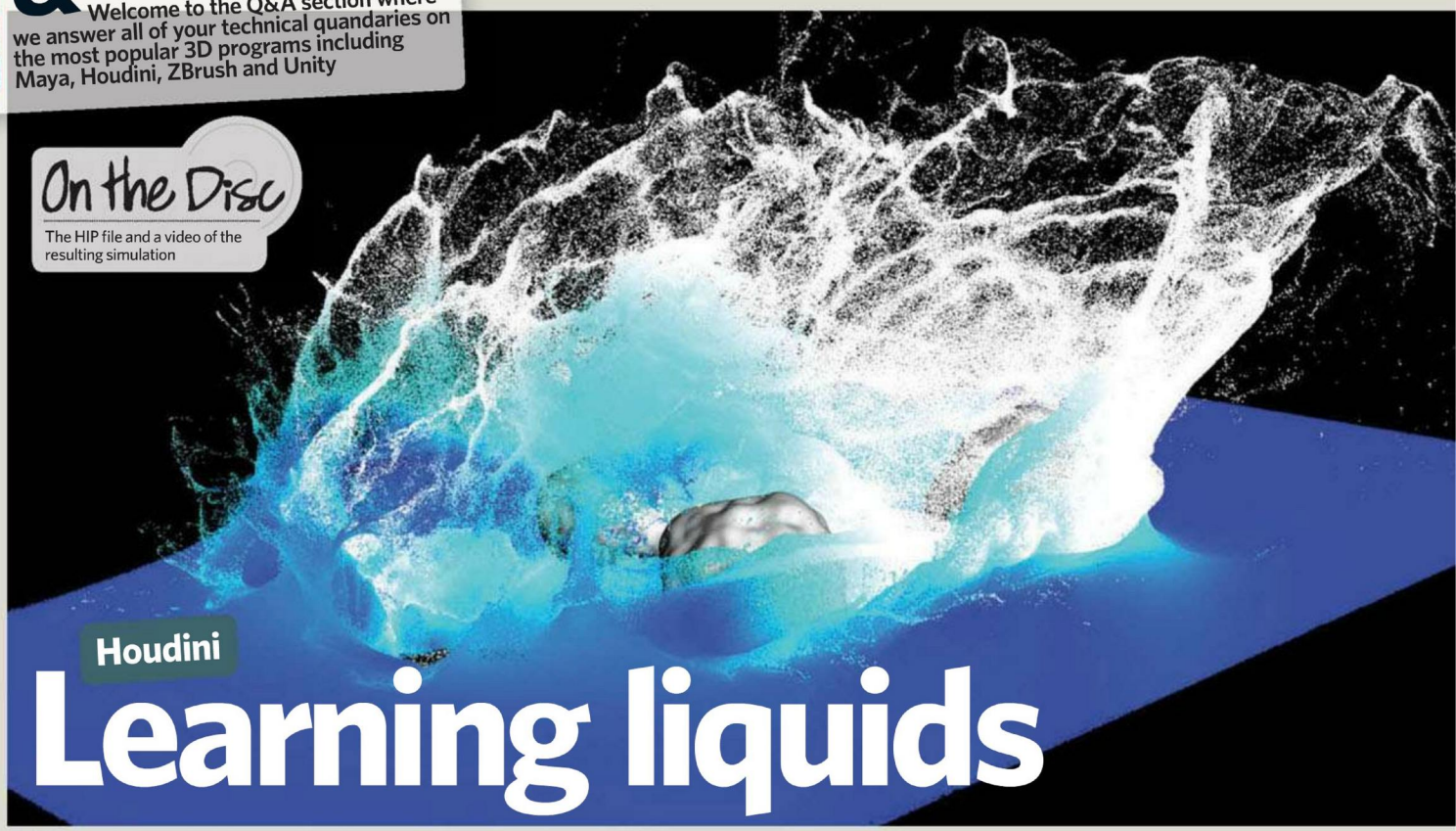
06 Final output

If you plan to render your final images from Maya in an EXR or HDR format, you can leave the Color Management Default Output Profile set to Linear sRGB. If you plan to render in any other format such as TGA, JPG, BMP or PNG, then you should set the Default Output Profile to sRGB. This will ensure that the final output from Maya is exactly the same as the renders that were being previewed F.

Welcome to the Q&A section where we answer all of your technical quandaries on the most popular 3D programs including Maya, Houdini, ZBrush and Unity

On the Disc

The HIP file and a video of the resulting simulation



Houdini

Learning liquids

How do I create a scene with big rocks splashing into water?

Fluid simulations are a very exciting part of computer graphics. In recent years we have seen huge improvements in this field. As PCs get more powerful, it becomes easier to simulate these complex phenomena. Almost every commonly used 3D package includes a good-quality fluid solver these days, primarily using FLIP solvers. This technique is a hybrid between particle and volume-based fluid simulations. All the fluid data is stored on particles, however at every step in time a volume gets created, the velocities get copied to the grid and the grid is used to perform the fluid projection. Then the new velocities get copied back to the particles. The main advantage of this method is that it can run with very few time steps, which makes the process very fast.

In Houdini 12 the new FLIP fluid solver is significantly faster and can handle much larger data volumes, which means that we can generate bigger and longer sims with a lot more particles. The workflow is greatly simplified and the legacy simulation issues are resolved. Accurate distribution of simulations without boundary artefacts is easy and the surfacing quality is much better.

In the first step we are going to create a pool to contain the water. Since we want to create a large-scale effect, the pool needs to be quite big. Its size will be 70 x 30 x 8 meters. In Houdini, fluid simulation collision objects are represented as volumes (SDFs). In order to get good-quality collision volumes, the walls need to be thick, at least 5m.

In Step 2 we will build a box that is almost identical to the interior of the pool. This will be used to initialise the fluid.

For this tutorial, we will throw rocks into the water. Step 3 describes how to model the rocks. We will create hires spheres and displace them by using procedural noise. The settings for the noise need to be in the range where they create visually interesting results while the geometry can still be converted to good-quality volumes for the collisions.

In the next step we will set up a DOP (Dynamic Operator) network to simulate the fluid. The pool will be used as a Static RBD Object, the rocks will be used as Dynamic RBD objects. Then we will convert the water geometry we create in Step 2 into a particle fluid. The particle fluid in the DOP network is represented by a FLIP Object dynamics node – which creates a particle fluid object with the necessary data and parameters – and a FLIP Solver dynamics node, which is the fluid solver itself. The Particle Separation parameter on the FLIP Object DOP node sets the resolution of the simulation, and it controls how many particles we have in the initial fluid volume. For setting up the network and testing everything, we should use a higher value (0.3-0.4), but for the final version it should be set to something like 0.05-0.07. This will increase the simulation time but is needed for catching all the nice details in the liquid's motion.

Step 5 will describe how to export the simulation data to disk. We will create a Dynamics ROP (Render Operator) and point it to the output of the DOP network and set the path for the on-disk files.

In Step 6 we will learn how to read back the simulation data for creating a flipbook or rendering. We will use a File DOP node and point it to the data on-disk. It will read the data and display it. At this point we can either generate a flipbook or set up a render. It's a commonly used workflow for baking the simulation data to disk and reading it back for rendering.

The HIP file and video showing the result of the simulation are supplied.

World Name: net

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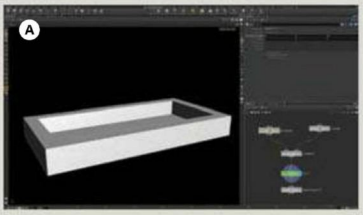

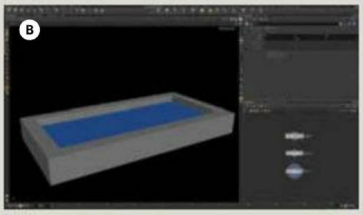

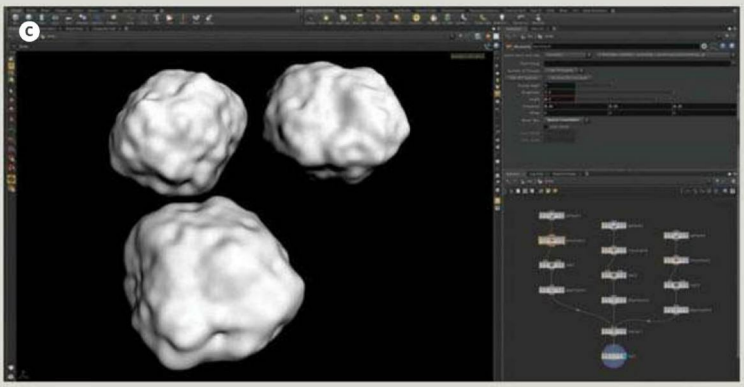

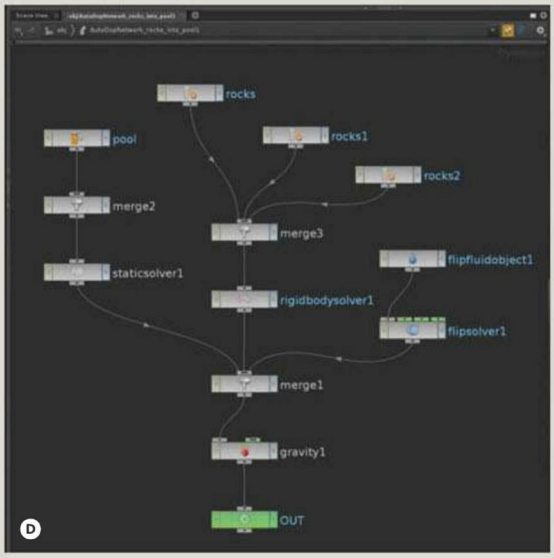

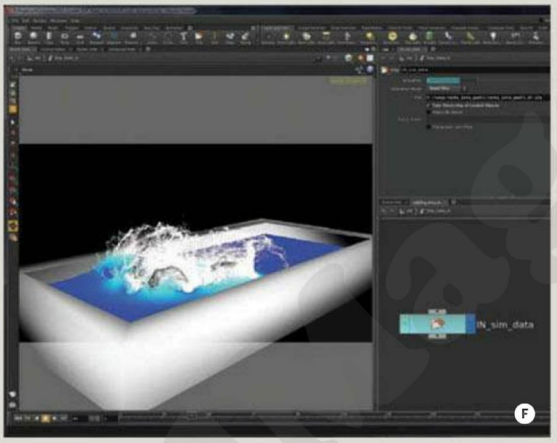

01 Create the water tank

Start a new Houdini scene and set the Frame Range to 1-240. In the Network View hit Tab, select Geometry and name it 'pool'. Hit Enter to dive into it. Hit Tab again and select Box. Set Size X to 80, Size Y to 9 and Size Z to 40. Create another box and set Size to 70, 8, 30 and Center to 0, 1.5, 0. Right-click its output and type 'cookie'. Connect the first box to its first input and the second to its second input. Set Operation to A minus B. Right-click its output and type 'Fuse' A.

02 Add water geometry

Go back up to object level and in the Network View hit Tab, select Geometry and name it 'water'. Hit Enter to dive into it. Hit Tab and select Box. Set Size X to 70, Size Y to 4, and Size Z to 30. Set Center X to 0, Center Y to -0.5 and Center Z to 0. This box represents the water and we'll use it to create the particle liquid from B.

03 Model the rocks

Go back up to object level and in the Network View again hit Tab, select Geometry and name it 'rocks'. Hit Enter to jump into it. Press Tab and select Sphere. Set Primitive Type to Polygon, Radius X to 4.3, Radius Y to 3.2 and Radius Z to 4.3. Set Center X to 3.7, Center Y to 0 and Center Z to -7.5 and Frequency to 30. Next, right-click its output and type 'mountain'. Set the Noise Type to Sparse Convolution, Height to 0.5 and Frequency to 0.35. Now repeat these steps to create more rocks, use slightly different values each time to achieve some realistic variations in the shapes C.

04 The dynamic network

Go back up to object level and, in the Network view, select the pool geometry container and on the Rigid Bodies shelf hit Static Object. Now select the water container and on the Particle Fluids shelf hit Flip Fluid from Object. Select the rocks container and on the Rigid Bodies shelf hit RBD Object. Make sure that the Uniform Divisions for the collision SDF representation is high enough for the rocks and the pool. Check it by displaying the Collision Guide Geometry D.

05 Run the simulation

Go to the Out context and in the Network View hit Tab and select dynamics. Set the DOP Path to the AutoDopNetwork and the Output File to a directory where the simulation files can be saved, typically something like C:\temp\sim.$F.sim. Set Valid Frame Range to Render Frame Range and set Start /End to 1 and 240. Clicking on the Render button will run the DOP network and write out the simulation data for every frame. For running hires simulations it's a good idea to click on Compress .sim Files to save disk space E.

06 Create the images

Go back up to object level and in the Network view hit Tab, select DOP Network and name it 'DOPs_data_in'. Hit Enter to jump into it, then hit Tab and select the file. Set Operation to Read and point the file to the data on the disk. Now go back up to object level and set the display flag on only on the pool, rocks and DOPs_data_in geometry containers then render a flipbook F.

Control the resolution of the sim

On the FLIP Fluid Object node, in the DOP network, the first and most important parameter is Particle Separation. This parameter controls the interaction distance between particles. Decreasing its value will decrease the distance between the particles, making the fluid more detailed and realistic-looking. It also means more particles that will increase simulation time. Since Houdini uses meters by default the setting for particle separation is 0.1 (10cm). This is a point to get a feel how the sim will look, but for the final simulation lower values need to be used. For large-scale simulations, 0.02 (2cm) is the threshold of stability, as smaller values can cause problems.

3DArtist Questions & answers

Welcome to the Q&A section where we answer all of your technical quandaries on the most popular 3D programs including Maya, Houdini, ZBrush and Unity

ZBrush

Mesh Insert brushes

"How do I create and use custom Mesh Insert brushes?"

On the Disc

- The custom Mesh Insert brush
- Two ZTools – the character and the tooth sculpt used to create the brush

ZBrush is a powerful tool for generating almost anything you can imagine. Like most 3D workflows, complex designs can rely heavily on recycled assets. Meshes you have used, for example, can be repurposed for a new project. Usually this is called 'kit-bashing'. ZBrush enables you to take those meshes, or tools, and save them out as a sculpting brush to be used in later projects. This can be something very simple, like a bolt or gear, or it can be very complex, like an entire character.

In this tutorial we will show you how to make your own Mesh Insert brushes and use them for creating surface details on a creature. Specifically, we will be using a custom Mesh Insert brush to place unique fangs and horns on this cyclops character bust. The process is very simple and requires very little setup time. In the end you will be left with a ZTool that will save you countless hours in the future!

Start by sculpting a mesh that can be used over and over again, with very little to no modifications. Before saving the mesh as a brush, position it in 3D space properly, as described in this tutorial. This way, the brush places the mesh onto another surface, facing the right direction.

In this case scale doesn't really matter, because as you draw with the Mesh Insert brush you are scaling the mesh itself. So the most important things to consider are orientation and rotation. To understand where on the surface your Mesh Insert brush will be located, you can turn the Floor of your scene on. You will notice that at the centre of your floor are the three axes. For what we need, these axes will be representing the surface normal you will draw the brush on in the future.

Set up your two ZTools: one being our sculpt and the other being the Insert brush. In the end you will be left with a perfect example of how to make your Mesh Insert brushes. For this character we'll use the same Insert brush for every spike – even the teeth. At first we won't worry about having variations among all the spikes, just place them at the proper scale that we want. Later we'll go through and manually manipulate them to become more unique.

01 Create custom parts

You can take any mesh you have sculpted and turn it into a Mesh Insert brush. We recommend taking the sculpt as far as you can and putting in plenty of detail. Typically it's best to sculpt it in DynaMesh to try to maintain the lowest resolution possible, without sacrificing too much detail work A.

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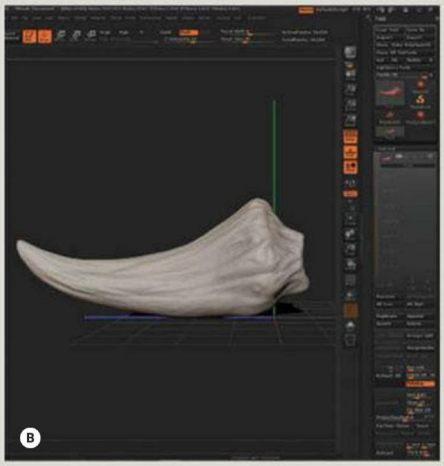
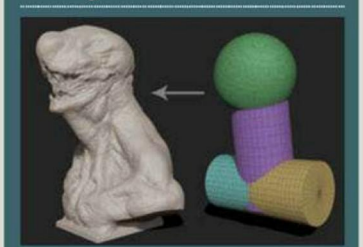


The ZBrush 4R4 revolution

Since this tutorial has been created using ZBrush 4R3, it's important to note here that the new version, ZBrush 4R4, streamlines the process further to enable even easier creation of Mesh Insert brushes. The principles remain the same, but instead you'll find a new Create Mesh Insert Brush button at the top of the Brush menu. This will take the current visible tool and, based on the viewport's orientation, will generate a new Insert brush.

The beauty of DynaMesh



You can also utilise the creative freedom of DynaMesh with your Mesh Insert brushes. When concepting it's a good idea to use multiple brushes in combination with one another to create a new idea. We don't usually plan on retaining any fine details from the original brush, but it's a good tool to get those specific shapes you want fast. Very often the primitive Mesh Insert Sphere or Cylinder will get the job done just fine. That's how we created this character bust from the start, by melding Spheres and Cylinders and pushing them into place.

02 Prepare meshes

If you want your tooth to be pointing off the surface you draw it on, you must make sure it's lying down on the Floor Grid as shown, with its top pointing along the blue Z-axis. If you want the tooth to be imbedded into the surface, make sure the tool's bottom-end is positioned past the green Y-axis B.

03 Save your brushes

Select the MeshInsert Dot brush and open the Modifiers tab in the Brush menu. By clicking the Mesh Insert Preview button you can then choose your sculpted tooth in the Tool list. You will see a preview icon get generated for your brush – you can now save your brush by clicking Save As at the top of the Brush menu C.

04 Create a reference mesh

We'll put these teeth on our cyclops sculpt as a separate SubTool, so we need to duplicate him in the SubTool list. We'll then use one of the lower subdivisions, while using the new brushes, and delete all the higher subdivisions on the duplicated tool. As stated earlier, the Mesh Insert feature will not work with multiple subdivisions D.

05 Place Mesh Insert brushes

If you hold Shift while placing your tools, you can prevent the mesh from skewing and it will scale uniformly as you rotate them into place. We'll get the majority of them placed, then later, with Masking tools and the Transpose line, fine-tune their orientation and placement to suit the specific needs of your character, if necessary E.

06 Delete the reference mesh

With all of the teeth placed, we will hide the temporary reference mesh. With the duplicated mesh hidden, and only the teeth visible, we will go to the Geometry menu and click DelHidden. This will delete any and all hidden parts of the mesh currently not visible. You are now left with a SubTool of just teeth, with their own set of PolyGroups to provide even more control F.

Unity

Interactive Cloth in Unity

"How do I use Interactive Cloth in Unity?"

With the introduction of the new and powerful features in Unity 3.5.2, we are now seeing elements in games taking advantage of this extra horsepower. The new Interactive Cloth in Unity is one of these features. If used wisely it can add that extra bit of immersion and realism to your scenes.

The use of cloth in games isn't something new, but as physics calculations are quite processor-hungry, it hasn't always been a top priority for game developers. In recent years though we have seen this technology evolve and more focus has been given to the physics in games. In addition to this, better tools and pipelines have made it easier for artists to transform their static 3D art into fully interactive cloth models.

In Unity you can use two types of cloth – Interactive Cloth and Skinned Cloth – but in this tutorial we will only cover the Interactive kind. Skinned Cloth, which is mostly used for character clothing, takes longer to set up, but will hopefully be covered in another tutorial. The Interactive Cloth is quite easy to set up and is very suitable for objects such as flags, capes, curtains, sails, basketball nets and even simple soft bodies. It can also be used for simple hair simulations and on objects that require a subtle secondary motion. In most cases, however, it would be better, faster and easier to rig and animate those kind of effects manually.

As the name suggests, the Interactive Cloth can interact with its surroundings and be manipulated in real-time. Not only can it be moved around and be affected by wind and gravity, but it can also be torn apart by other objects in the scene. For this interaction to be fluid, the cloth mesh should be as low-poly as possible. Depending on the hardware you are targeting, the best thing to do is test with different resolutions. Keep in mind that the cloth simulation can also be turned off when it's out of the player view, so you should be able to crank up that polycount in a lot of cases.

As you will see in this simple tutorial, Interactive Cloth in Unity gives you plenty of possibilities, but will take some time to get right. Once you've started playing around with this feature though, it will probably be the most fun you'll have inside a game editor.

01 Scene setup

For scenes that will use physics and cloth simulations, we should always make sure our scale is set up correctly. If the scale isn't set up to replicate the real world, the physics will most probably live their own life. It's also a good idea to place the objects that will use the cloth in the middle of the scene [0,0,0], so that it will be easier to set up properly later on A.

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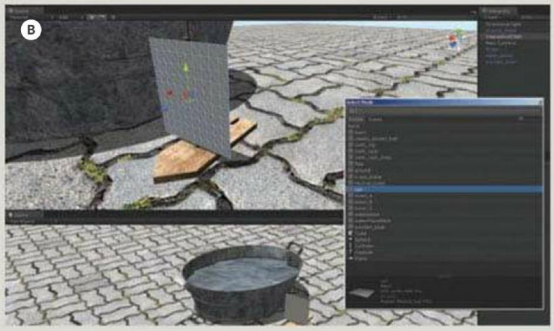
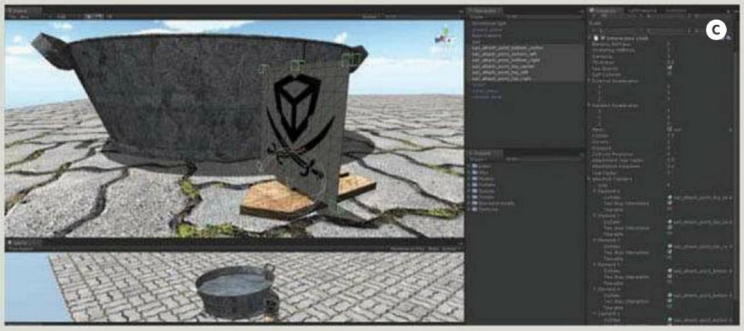
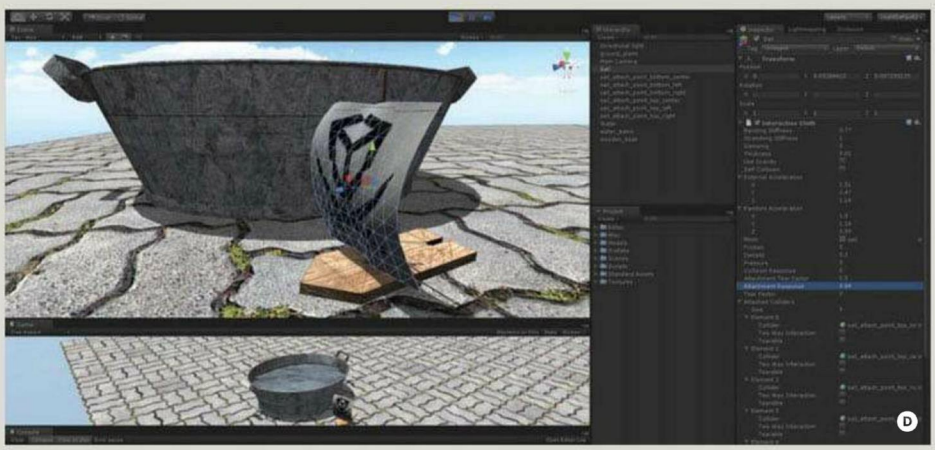
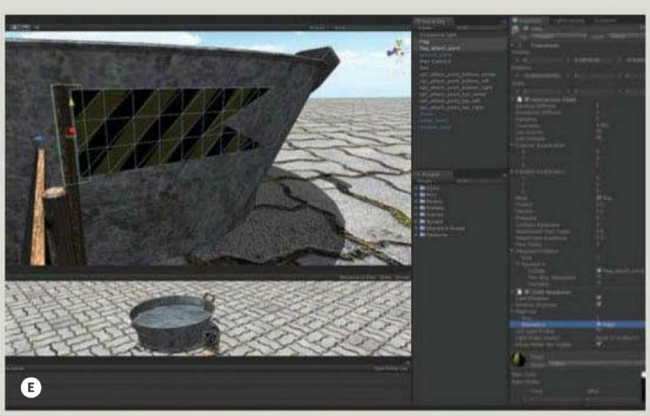




Vertex shaders

Since cloth simulation can be quite processor-hungry, it's not very suitable for handheld devices. This doesn't mean you can't create nice-looking cloth on these devices though, as some smart programmers came up with Vertex shaders. These are basically shaders, or surface materials if you like, that affect the vertices of the model and can emulate some extremely fancy cloth effects such as flags blowing in the wind, wavy grass and even ocean waves. These shaders can be quite tricky to create for an artist, however, but there are some really good node-based shader editors available.





02 Add interactive cloth

Our wooden boat needs a sail, so by choosing GameObject>Create Other>Cloth from the File menu, the default cloth object appears in our scene. This is not what we want to use as our sail, so by clicking the Mesh slot in the inspector, we'll replace the default mesh with our custom sail mesh. To finish we'll align the Interactive Cloth to the boat and replace the default material by going to the Materials slot under the Cloth Renderer panel B.

03 Attach the sail

To be able to attach our sail to the boat, we can use any object that has a collider to act as an attach point. The default cube with its mesh hidden is perfect for this. After placing six of these where we want our sail to be stuck, we will now hook them up to the sail itself. Selecting our sail, we'll find the Attached Colliders setting and insert 6 in the Size slot. Finally we'll drag and drop all the attach points we created onto the Collider slots C.

04 Test and make tweaks

Having connected our sail to our boat, it's time to hit Play and see how it looks. Usually, not a lot happens until you start tweaking the External/Random Acceleration values and other settings such as Bending Stiffness, Density and Thickness. Keep in mind that the tweaks you make when playing the scene won't be saved, so having a pen and paper nearby, or capturing screenshots of your settings, is highly recommended D.

05 Add the flag

Now that we have an Interactive Cloth that works well in our scene, we can just duplicate this object and replace the sail mesh with the flag mesh. By duplicating the sail we will keep all it's acceleration forces, so the wind direction of the flag is the same as the sail. Some tweaks will be necessary though. We must also replace the material and add a new attach point for our flag E.

06 Make a prefab

If we try to move the boat the cloth won't follow, so now is a good time to link everything together with a prefab. Selecting GameObject>Create Empty from the File menu, an empty GameObject appears in our scene. This will be the root of our boat, so after making sure it is placed in the centre of the scene, we'll drag all the needed objects to this one in the Hierarchy view. Finally, by dragging the root object into our project view, our boat prefab is created F.

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A conceptual sculpt made using DynaMesh. It was retopologised with QRemesher, Replace Mesh, and the new Curve Brushes

ZBrush 4R4 $699 US*

3D Artist gets a first look at the new modelling tools and topology features plus countless additional upgrades in the new iteration of ZBrush

This summer, Pixologic releases its latest iteration of ZBrush to the market. Pixologic is one of the leading software developers that keeps the artist's workflow in mind, always attempting to separate itself from the expected. This new version of ZBrush builds on these ideas, allowing for complete freedom and speed. The two big and important features that we'll look at are the new topology tools, like Replace Mesh, and the addition of Mesh Insert Curves. Other new features include the Under History feature, an improved Transpose line and many more adjustments to existing tools.

In terms of production, the new Replace Mesh feature is sure to turn heads! The idea behind it is rather simple, but the possibilities are huge: taking what we love about DynaMesh and turning it into a new way of thinking, you now have the ability to combine meshes together and retain their poly flow. This means that, rather than completely retopologising your mesh – either with DynaMesh or the Remesh features – ZBrush will weld the meshes together, while respecting the edge flow of your topology. This is great for those of us who are bound by topology in a production setting, or even reuse topology from another model. In the end, this is a great way to control your topology and still have the creative freedom of DynaMesh.

In past releases of ZBrush, we've seen the introduction of Curves. ZBrush has now moved this technology into the Mesh Insert brush. By activating the Curves Mode in the Stroke menu, your custom Mesh Insert Brush will now be duplicated based on your desired settings, along a curve that follows an existing surface. The curve functions both organically and as a rigid object, which is determined dynamically based on the mesh being used. The curve also works in a very fluid way – much like a ribbon draped across a surface. This means you can pull the curve around and adjust it as easily you would adjust a piece of fallen rope on your model. Another plus to this new feature is the ability to have a start piece and an end piece to the curve, as well as a repeated shape in between. This opens up so many doors to artists, including but not limited to chains, straps, bolts, zippers, spikes, and a lot more.

Curves can also be found in the brand-new Topology tools with the Topology Brush. This brush uses overlapping curves as guides for the polygons. With a few strokes on the model you will be generating fresh topology wherever curves overlap to form triangles or

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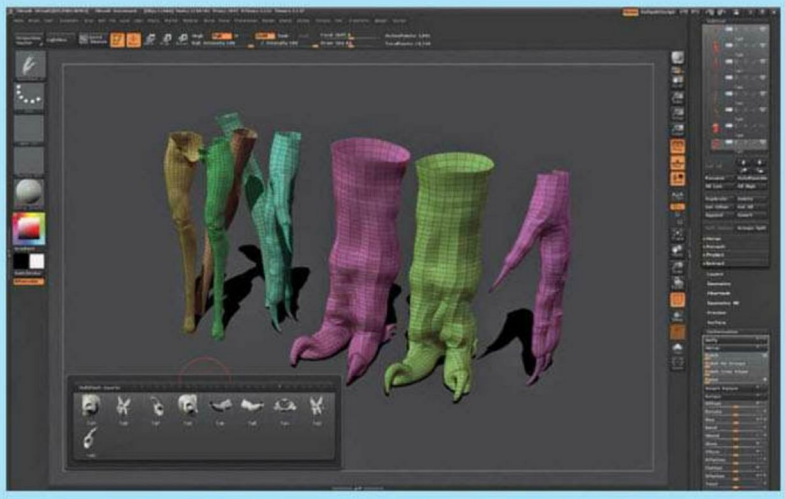
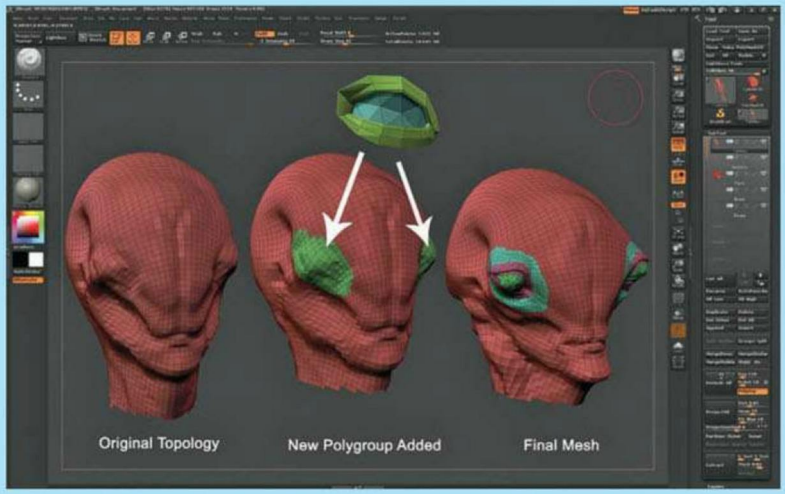


There are new tools to create new meshes and to retopologise your model. The new Curve Snap Surface Brush and the Topology Brush both use curves



Define a new PolyGroup to an area and, after using a Mesh Insert brush, update the mesh just like you would DynaMesh to see the results

quads. Depending on your settings, the topology generated from these curves (by clicking on the mesh) can either act as a mesh extract with thickness or one-sided polygons. This is perfect for new SubTools, or retopologised surfaces for production. Previous versions of ZBrush introduced the plug-in QRemesher, which was an automated feature that analysed the mesh and retopologised it with quads and even polygon distribution. Now you have more control with masking recognition, polygon count and quick options that will either halve or double the existing poly count.

A big favourite of ZBrush artists out there is the previously mentioned Mesh Insert brush. With this latest release, you can now take all of the SubTools in their Tool and turn them into a Multi Mesh Insert brush. Think of it as a project brush, filled with all of your organic creature parts. It could perhaps be your go-to collection of Robot parts, all in one brush. By hitting M on the keyboard, you gain access to all of the meshes inside of the brush. To make an Multi Mesh Insert brush, it's just a matter of clicking Create Multi Mesh Insert in the Brush menu. You can also create a singular Mesh Insert by clicking the neighbouring button. The object(s) will be drawn based on the camera angle and world space when the Create buttons are pressed.

Pixologic has managed to create significant improvements to its already successful software. Whether you are looking to streamline your production pipeline, or bring more creativity to your home studio, with these new additions and existing tool sets ZBrush is a must for any 3D artist.

*Manufacturer's suggested retail price at the time of going to press. ZBrush 4R4 (for Windows and for Mac) is available to the public from 9 July 2012. A free upgrade is available to all registered ZBrush customers. For EDU Licences for students and institutions inquire at sales@pixologic.com.

The good & the bad

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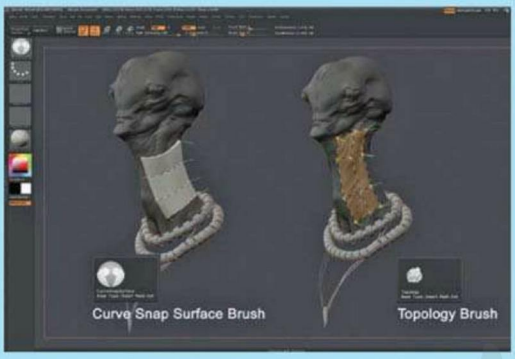
- RAM: 1,024MB (2,048MB recommended)
- Monitor: 1,024 x 768 monitor resolution (32-bit)

MAC SYSTEM REQUIREMENTS:

- OS: Mac OSX 10.5 or newer
- CPU: Intel Macintosh
- RAM: 1,024MB (2,048MB recommended for working with multimillion polys)
- Monitor: 1,024 x 768 monitor resolution set to Millions of Colors (recommended: 1,280 x 1,024 plus)



Split your model into SubTools. In the Brush menu you can create a Multi Mesh Insert brush from these objects for later use

Our verdict

Features	10/10
Ease of use	8/10
Quality of results	9/10
Value for money	10/10

"Pixologic adds new tools to an already innovative application, making this version of ZBrush another victory"

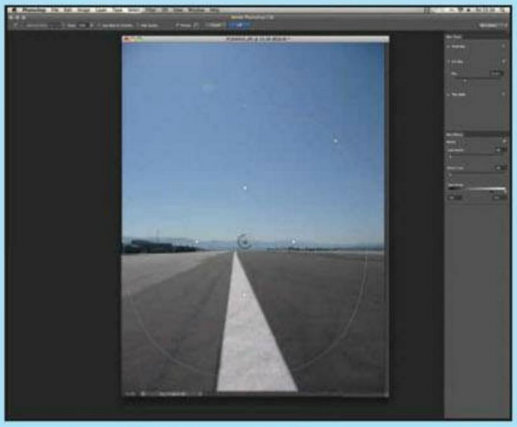
Final Score 9/10

Workbooks.net

Photoshop CS6 £667 / $699 US

Photoshop is the benchmark platform for CG artists, designers and photographers alike, and can be integrated into a host of creative workflows

Experimenting with composition by moving objects, retouching them and altering their shape is now a swift and fluid exercise courtesy of the new Content-Aware Patch and Move tools



Here are the new Blur tools showing the Iris blur and accompanying Effects panel on the right – the degree and extent of blurring can be manipulated

The Content-Aware Move tool can be used to remove awkward shapes such as figures, and then combined with the Patch tool to alter object composition

The first thing you will notice about Photoshop CS6 is the interface, which now by default assumes a slate-grey palette. For traditionalists, however, this can be easily customised to adopt the original colour scheme we know and love. It's a feature that will, for the most part, be modified initially and thereafter left untouched, but it can be tailored to help complement individual images.

Content-Aware modes are now a familiar feature, but they have been enhanced to encompass the Patch and Move tools. The Patch tool now enables you to sample an area and in turn adjust how it blends within the image, while the Move tool seamlessly blends a moved element into a scene. This function also works in an Extend mode, which means you can change the proportions of a selected object or even alter the picture format swiftly and easily.

For those creating textures from photographs, the new Perspective Crop tool is very useful for removing lens distortion by straightening and aligning edges. Grouped within this toolset are the enhanced cropping options that now include non-destructive editing, as well as offering compositional aids such as the rule of thirds.

All of this is supported by the new Mercury Graphics engine that delivers an immediacy that was previously absent. This upgrade utilises your computer's GPU, speeding up the workflow across a number of areas, including Puppet Warp and filters such as Liquify and the new Adaptive Wide Angle used to straighten objects distorted by wide angle and fisheye lenses.

Other new features that take advantage of this are the new Blur effects – notably Iris, Field and Tilt-Shift. These are both versatile and responsive, offering a preview window alongside tools and effects panels. Visual devices within the image permit intuitive control via focal points and dial rings, which affect aspects of the blurring.

While there are far too many new features to cover, it's of course worth mentioning the 3D improvements, which now integrate context-sensitive editing, moveable shadows and quicker render times thanks to the graphics engine. Also useful is the inclusion of the Vanishing Point filter that establishes the ground plane, enabling 3D objects to be dropped into a photograph.

Other notable additions include the Camera Raw 7 plug-in that enables far more control over tonal and contrast adjustments in JPEG and raw files, as well as some new Erodible and Mixer brushes. While users accustomed to Auto Saves will be pleased with the very welcome addition of Auto-Recovery and Background Save. This works in the background, ensuring uninterrupted progress and preventing any extensive loss in editing.

There are numerous other enhancements, but overall the advent of CS6 presents a host of both new and improved features with a versatility that is certainly hard to match.

www.adobe.com/products/photoshop

Our verdict

Features	9/10
Ease of use	8/10
Quality of results	9/10
Value	9/10

"A big step forward within Photoshop's evolution, showing improvement in new and existing features"

Final Score 9/10

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After Effects CS6

£1001 / $999 US

Hailed by beta testers as the biggest release of the past ten years, we investigate the new version of After Effects

On its 25th anniversary, Adobe launched the CS6 version of its visual effects and motion graphics software After Effects, focusing more on integrating 3D, saving time for its customers by improving the cache preview philosophy and a whole lot more.

The new Global Performance Cache is a saviour of both time and nerves. The whole architecture of the RAM preview has also changed, as now you can render only what you absolutely need to, rather than waiting for the preview after every small change. You can also render your footage in the background while working on it at the same time. Another great feature is that your disc can cache everything you've been working on, and once you close and reopen the file you will have your footage cached and ready for you to continue with the project.

The 3D Camera Tracker is another great feature. While not as good as Mocha or some other third-party plug-ins, it does give you great results in a matter of seconds. You simply have to Ctrl/right-click over your footage, choose the Track Camera option and wait for the footage to be analysed in the background. This will give you a 3D cloud of tracked points over your 2D footage. You can use these points as a parent for any kind of layer which will track, scale and auto-position properly over the footage. There is also a new type of solid you can add called Shadow Catcher. This solid is created to display only shadows that are cast from other layers, and the cool thing is that you can copy moving frames of the camera into other applications.

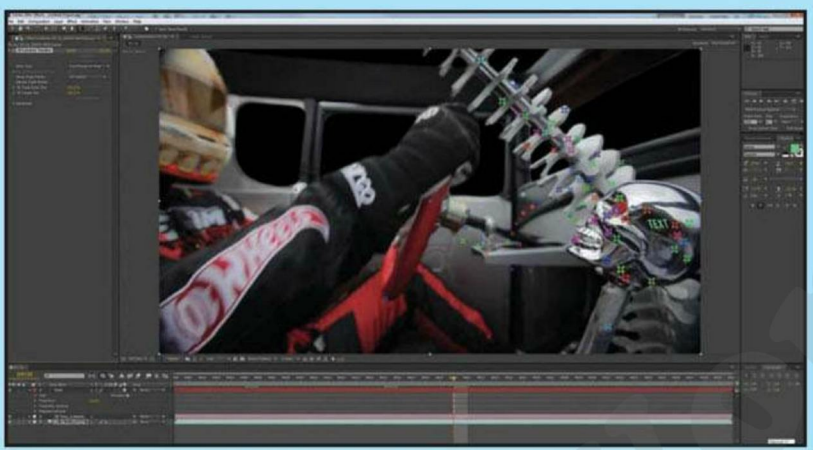
The biggest change, however, has come with the new 3D ray-traced engine. In order to have 3D objects in After Effects, you either have to cheat by multiplying your layer along the depth axis numerous times, or use the help of another software, such as CINEMA 4D or 3ds Max. The new engine doesn't deal with poly modelling or advanced tasks – it only does extrusion over your shape or text layers – but for now that is more than enough. Now you can import files from Illustrator directly into After Effects and convert them to 3D with ease. It also offers great material options with reflection, refraction, specular and so on.

Other honourable mentions include the Mask Feather tool, which gives you the ability to feather parts of the mask you need, rather than the whole mask. All in all, After Effects CS6 has a great foundation for poly modelling. It will be interesting to see if the guys at Adobe work on this in the future.

Creating moving images has never been easier – all you have to do is come up with the ideas and the software will help you realise the rest

While it may be one small step for Adobe, CS6 offers a giant leap for motion-graphics artists everywhere!

> "Now you can import files from Illustrator directly to After Effects and convert them into 3D with ease"



Getting tracked footage in a matter of seconds gives you more time to focus on the final result

www.adobe.com

Our verdict

Features	9/10
Ease of use	10/10
Quality	10/10
Value	8/10

> "Ideal for motion-graphics artists who really care about results"

Final Score 9/10

3DArtistMags.net

HP Z1 Workstation WM433EA

£3,000 The all-in-one workstation with enough horsepower to impress professional 3D artists

All-in-one computers are attractive due to their convenience and quiet operation but, until now, no firm had designed one capable of the workload demanded by 3D professionals. HP has applied its engineering know-how to this problem to produce the Z1 Workstation, a monstrously heavy 27-inch all-in-one that packs a serious processing punch.

Unlike Apple's iMac, the Z1 is user-serviceable. By lifting the screen away from the chassis, components can be swapped out and added, with some in custom-designed caddies for tool-free removal. Although the base spec is little better than an average desktop computer, it can be fitted with an Intel Xeon processor and mobile NVIDIA Quadro graphics card and up to 32GB of ECC or non-ECC memory.

The LED-backlit IPS display lacks touch sensors, although HP has hinted future Z1 models will support them. However, its excellent 178-degree viewing angle and 30-bit colour accuracy are essential for professional environments. Four USB 2 ports and a DisplayPort connector are located underneath, and at the side there are two USB 3 ports, a card reader and optical drive.

There's a choice between either a single 3.5-inch internal hard drive or a pair of 2.5-inch drives, which can be configured as a RAID array, with either Windows 7 Professional, SUSE or Red Hat Linux pre-installed.

At this price point, HP sent us a Z1 Workstation with a 3.5 GHz quad-core, eight-thread Intel Xeon E3-1280 processor and 8GB of memory. The E3-1280 was last year's 32nm Sandy Bridge-based model instead of the 22nm Ivy Bridge model, but still a very high-performing processor.

There are four NVIDIA Quadro graphics cards to choose from – our Z1 came with a Q3000M GPU. The 400W power supply, limited airflow and internal space limit the Z1 to mobile graphics cards and the result is lower overall rendering performance than you'd get from a desktop workstation. What's more, the custom-designed MXM modules can't be replaced with an off-the-shelf graphics card and have to come directly from HP.

The Z1 is still a good performer, though. It produced a great CINEBENCH 11.5 CPU score of 7.04, and its SPECviewperf 11 and 3ds Max render times were respectable, although not record breaking.

The unfortunate truth is that compromises must be made to squeeze powerful computer hardware into the back of a monitor, and the same money will buy a better-performing traditional workstation.

That isn't the point, though, as the Z1 is the first all-in-one that's competent at hardware-accelerated 3D rendering, and has plenty of grunt for the majority of design tasks!

The HP Z1's screen lifts upwards to reveal the internal components, which can be removed and replaced by the user

GPU acceleration in Adobe CS6

The NVIDIA Quadro in the HP Z1 increases performance in Photoshop and After Effects CS6

The Mercury Graphics Engine in Adobe CS6 uses a computer's GPU to accelerate processing of certain functions. With a certified video card, such as the NVIDIA Quadro in the HP Z1, both previewing and applying filters in many Adobe applications is dramatically faster than when relying on the CPU alone. This can reduce time spent applying effects, and makes it possible to work with larger files.

Photoshop CS6 uses the OpenGL framework to apply effects such as Liquify and Puppet Warp, while others, including Oil Paint, are only available when graphics acceleration is enabled. Blur effects rely on OpenCL for acceleration, although this requires an up-to-date NVIDIA driver.

In After Effects CS6, the OpenGL ray-traced renderer is accelerated by the GPU, as is the improved Global Performance cache. When manipulating frames within a scene, the GPU's resources are optimised to render frames in the background, freeing up the rest of the system to ensure it remains responsive.

With a 30-bit display, Intel Xeon processor and NVIDIA Quadro graphics card, the HP Z1 is an all-in-one professional workstation

http://tinyurl.com/3dartist-HPZ1

Our verdict

Features	9/10
Ease of use	8/10
Quality	9/10
Value	7/10

"A fantastic achievement, and most definitely worth considering"

Final Score 8/10

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Artist info

RenPeng Dong

Personal portfolio site
www.oldrhyme.cgsociety.org

Country China

Software used
3ds Max, Maya, ZBrush, Mudbox, Photoshop, V-Ray

"I saw an image on a website that was like a kind of transparent man blending with his background, which brought me this great idea... [I] decided to show the feeling of part drying paint, part real, part plaster"

Non-US readers turn to page 92

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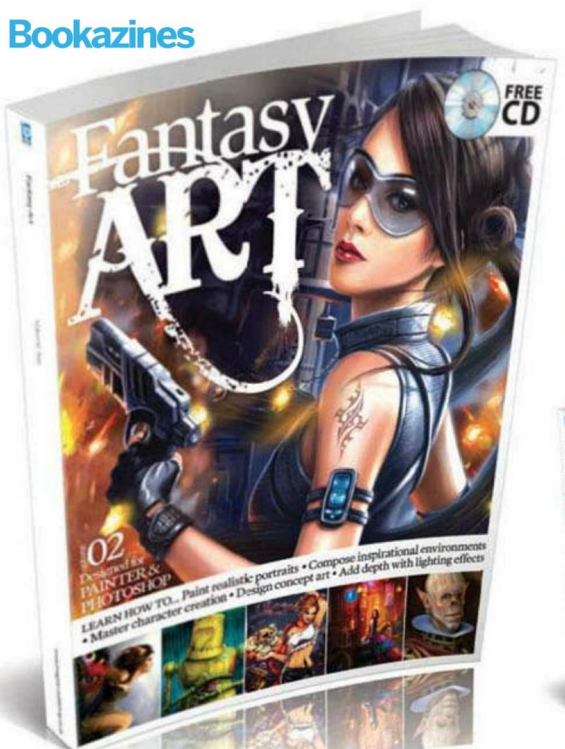
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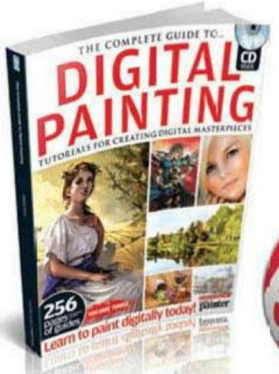

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> "There's a degree of stress to any occupation where success is based on always improving, but compared to the alternative it's a stress I gladly accept"

Chris O'Riley on the challenges and rewards of working in the highly competitive advertising sector. Page 108

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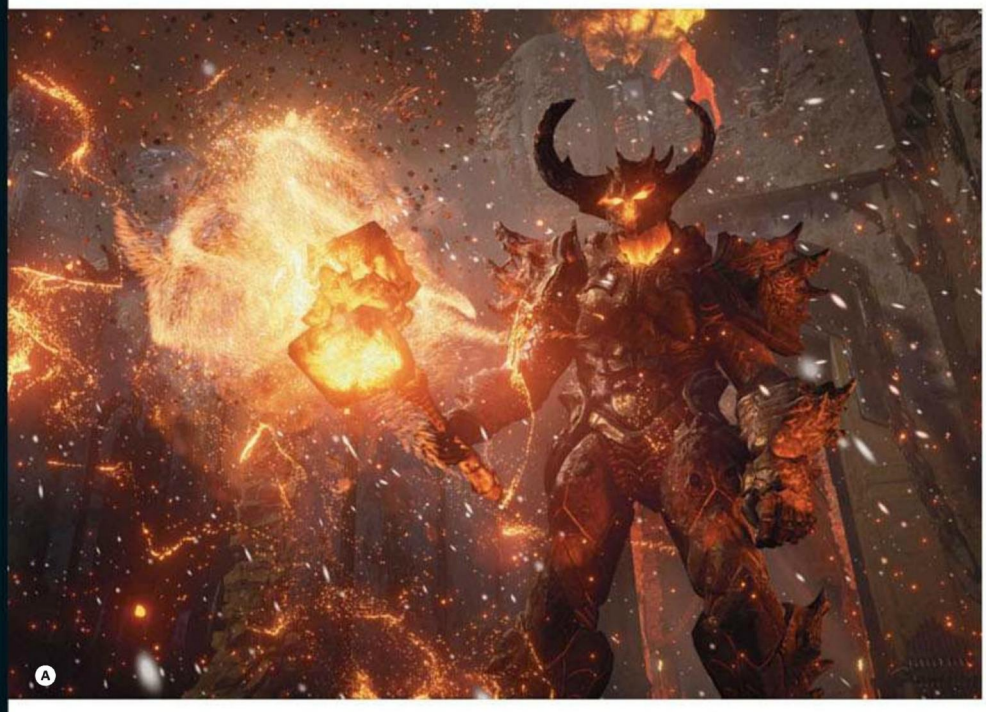
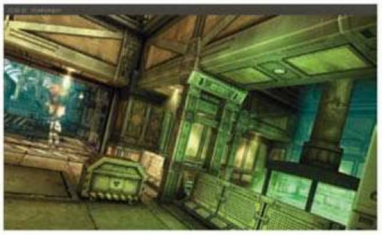


Mecanim explained

Mecanim is Unity 4.0's new character animation technology. "You can bring in animation from other applications... drop it in and Mecanim will... automatically apply it to whatever mesh you have," explains Helgason. "We'll have copious amounts of animation data in the marketplace... you can download and apply to your own models."



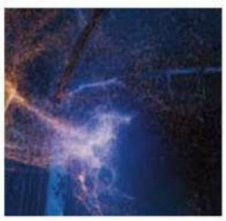
Support of Linux opens up around 10 per cent of the PC market to Unity 4.0, while the ability to publish to Adobe Flash Player creates access to one billion PCs

Unreal and Unity fourth versions announced

Epic Games and Unity Technologies aim at opposite ends of the scale

A Unreal Engine 4 will undoubtedly be aimed at the higher end of the scale, while Unity 4.0 remains at the same low cost to also appeal to students and indie developers

B Unity 4.0 will continue to build on great visuals for mobile games, but visuals that can also scale across to PC and web-based gaming platforms



Watching Unreal Engine 4's new particle and lighting systems play off each other is extremely impressive stuff!

Not one, but two 'U4' game engines have recently been revealed in the form of Unity Technologies's Unity 4.0 and Epic Games's Unreal Engine 4. Both are set to make a big impact in the industry, but in entirely different ways.

The launch of Unity 4.0 continues to level the playing field between the largest and smallest studios, enabling anyone from the most indie game designer to the biggest multinational studios to develop groundbreaking games.

"We think of Unity as giving nuclear arms to indies," says Unity CEO David Helgason with a chuckle. "EA and the big companies are using our stuff, but at the same time we have a free version that has almost the same features that an indie or student can use. We're keeping that level of simplicity." Unity 4.0 will feature an overhaul of the Unity engine while introducing new features such as DirectX 11 support, modern mobile graphics, the addition of Adobe Flash and Linux as new publishing platforms, and the new Mecanim character animation system.

Although it will be used for mobile development, Unreal Engine 4's focus remains far more centred on the console end of the scale, and boasts the most sumptuous visuals seen from the software yet. Lighting has been a huge focus, featuring real-time global illumination via voxel ray casting, which no longer requires any lighting precomputation. Excitingly, there's also a dynamically lit particle system that can support extremely high numbers of particles with complex simulations and vector displacement fields.

However, according to Helgason, it's the here and now that's most important for the company. "[Unreal 4] is running on futuristic hardware which we won't see on the market for quite a while," he reveals to us. "I think the key thing is that Unity is here right now. It's solving real problems today, on real hardware."

Unity 4.0 is available for pre-order now and the first Unreal Engine 4-powered game is expected to ship some time in 2013.

> "The Unreal Engine 4... boasts the most sumptuous visuals we've seen from the software yet"

Upping the game

Unity 4.0 fully supports Microsoft's DirectX 11, offering increased shader capabilities, tessellation for smoother models and compute shaders for advanced GPU computation. Mobile platforms will see enhanced visual fidelity, skinned mesh instancing, the ability to use normal maps when baking lightmaps, and a refined GPU profiler.

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Windows 8 on a tablet

Microsoft makes its belated entry into the tablet market with the announcement of Surface

Microsoft has announced a new 10.6-inch tablet computer named Surface, featuring a built-in kickstand, cover and multi-touch keyboard, all running on either Windows 8 or RT.

Two models will be available, one with 64GB or 128GB of storage, powered by Intel's Ivy Bridge and running Windows 8, which also sports a built-in kickstand, and will support digital ink through a magnetised pen that sticks to the body of the tablet.

The other, available with 32GB or 64GB, comes in a thinner case and contains an ARM chipset and Windows RT, the version of Microsoft's operating system that is specifically designed for ARM devices.

At the time of writing there has been no announcement of pricing or release date; the cost will be revealed closer to availability. The Windows RT model is expected to release alongside Windows 8, with the Intel version following three months later.

© www.microsoft.com/surface

Shortly after the initial announcement, Epic Games' boss Mark Rein quickly Tweeted his enthusiasm for Surface, saying: "Can't wait to get some Unreal Engine games on those babies!"

Marvelous Designer makes waves with cloth

CLO Virtual Fashion's software produces realistic clothes for 3D models with far less fuss

CLO Virtual Fashion promises to usher in the future of 3D-clothes design with Marvelous Designer, a clothes modeller whose professional-grade rendering and templates can greatly simplify complex clothing simulations.

Built on swift modelling tools and a mix-and-match layering system that can mimic all types of cloth variations, Marvelous Designer can help CG artists side step the time-consuming practice of creating clothes by shaping, draping and applying the details to their digital assets. Users can apply different outfits, details and clothing expressions to any piece they've already started without the need for new modelling, allowing designers to focus on patterns and form rather than detail sculpting.

Software shorts

Bringing you the lowdown on product updates and latest launches

Maxwell Render Suite 2.7

Next Limit Technologies releases Maxwell Render Suite 2.7, a free update for customers of Maxwell Render 2.6 with a whole host of improvements. New additions include the Grass generator to quickly create grass on selected geometry. Other additions include MXI/MXS compression and a new 3D vectorial displacement type for RealFlow displacement.

Motion Capture 2.0

iPi Soft is now shipping iPi Motion Capture 2.0, the latest version in its family of low-cost mocap tools. Motion Capture 2.0 features improved tracking and support for Kinect for Windows and Asus's Xtion hardware, with multi-character tracking coming in the autumn. The Express edition costs $295 US, the Basic edition $595 US and the Standard edition $1,195 US.

FurryBall 3.0

AAA Studio releases a major update to its GPU-based Maya renderer, augmenting FurryBall's shading, lighting and particle rendering capabilities and adding several new features. FurryBall is now integrated as a regular Maya render engine, so there's no need to export data. It costs €999 EUR for the standard edition and €1,499 EUR for the STEREO edition.

Insightful snippets

New post-production studio Hoxton Redsox opens in London's East End

Hoxton Redsox has opened as London's newest VFX studio, founded by Paul McGeoch, Giancarlo Bonati and Stefan Gerstheimer. Between them the trio have worked at The Mill, MPC and Pictures On The Wall, and have created work for Radiohead and the BBC.

The facility aims to offer a full range of visual-effects solutions. "Giancarlo, Stefan and myself share a passion for creating great imagery and have gained excellent experience working at the forefront of innovation in visual effects for a range of clients," says McGeoch. "As a boutique VFX company we offer the same high-quality imagery as larger post houses, but with a more personalised, dedicated service."

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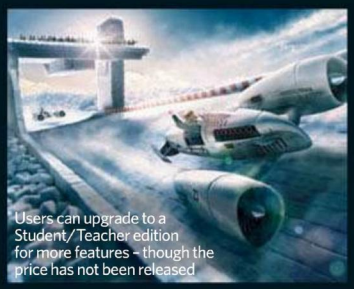
Free software

Maxon to release free CINEMA 4D Student Version

Maxon is to release a free Student Version of CINEMA 4D intended for non-commercial use. Whereas most 3D tools' educational licences can cost anywhere from $99 US through to the mid hundreds, CINEMA 4D Student Version will be free, despite featuring almost identical features to the Studio edition of the software. It will, however, lack support for network rendering and any plug-ins dependent on serial numbers. Licences will last up to 18 months, with the software available some time this autumn.



Users can upgrade to a Student/Teacher edition for more features – though the price has not been released

© Ulli Staiger www.dielichtgestalten.de

New tools

For the first time, Faceware Technologies makes its internal software available to purchase

Faceware Professional

Faceware Technologies has released its Faceware Professional Product Line for commercial use, consisting of updated versions of its Faceware Head Mounted Camera System and Faceware Retargeter, along with a brand-new product called Faceware Analyzer.

Faceware states that the suite offers a low-cost, start-to-finish facial animation workflow to capture, analyse and create realistic facial performances three to ten times faster than hand keying the same performance. You can learn more and purchase the software at **www.facewaretech.com**.

Faceware has previously been used in notable projects such as *The Curious Case of Benjamin Button*, *Grand Theft Auto* and the *Halo* series

"Opinion"

Autodesk's next move

Greg Castle of Autodesk Gameware discusses a new interactive frontier

Greg Castle is a master trainer for NUKE compositing and is Autodesk's senior product marketing manager

Greg Castle www.gameware.autodesk.com

Autodesk is widely known for its leading 3D animation software, but we have recently made a notable investment in runtime technology for game development. Autodesk has now grown this offering to focus on high-value areas like design and gameplay.

Our portfolio today offers production-proven solutions for user interface development, artificial intelligence, lighting and character animation that have been used in more than 1,000 games, including *Deus Ex: Human Revolution*, *Gears of War 3* and *Crysis 2*.

> "Our portfolio today offers production-proven solutions"
>
> **Greg Castle,** senior product marketing manager, Autodesk Gameware

Autodesk developed the *Hyperspace Madness* game as a proof-of-concept to demonstrate what is possible

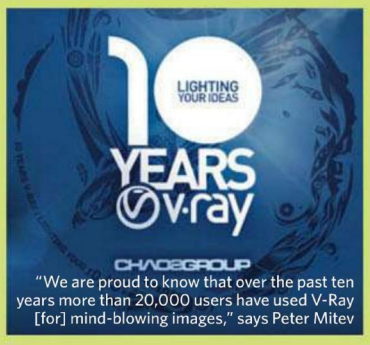
We have created a new Autodesk Gameware brand and website that brings all of our game development tools and middleware together under a single banner. We recently unveiled that our artificial intelligence (AI) portfolio has been extended with two new products: Autodesk Cognition and Autodesk Population. Autodesk Scaleform also now offers new enhancements designed for mobile games.

Through a new agreement, Nintendo will provide three of our Gameware products to the Wii U development community, and we have added Crytek and Havok to the list of engine providers who have integrated our products.

To learn more about Autodesk Gameware, visit **www.gameware.autodesk.com**.

Congratulations to...

V-Ray celebrates ten years of rendering with a new website

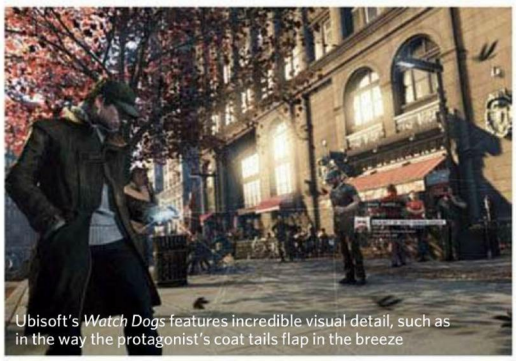


"We are proud to know that over the past ten years more than 20,000 users have used V-Ray [for] mind-blowing images," says Peter Mitev

2012 sees Chaos Group celebrate ten years since the first release of V-Ray, which has grown from a plug-in for 3ds Max to a comprehensive set of rendering solutions for the entire visualisation industry. To celebrate this milestone, Chaos Group has created a special anniversary website at **http://vray10.chaosgroup.com**, where you can discover the making of the renderer, look through a gallery of pictures and check out some of the new promotional bundles.

Next-gen graphics

Did we catch our first sneaky glimpse of the next generation at E3?



Ubisoft's *Watch Dogs* features incredible visual detail, such as in the way the protagonist's coat tails flap in the breeze

Last month's E3 showcased a lot of exciting new games, but stopped short of revealing any new hardware. However, rumours abound that several titles were in fact next-generation efforts in all but name. *Star Wars 1313*, *Watch Dogs* and Square Enix's real-time tech demo *Agni's Philosophy* all showcased a level of visual flair that could very well be our first glimpse into the next-generation of videogame technology. We'll have to wait until next year to find out for sure.

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Project Focus

'Cocaine Unwrapped – The Machine'

Platige Image uses CGI to illustrate the damage a line of cocaine can do to people across the world

platige image

Project Cocaine Unwrapped – The Machine

Description A short from a larger anti-drugs campaign, 'Cocaine Unwrapped: The Machine' depicts mechanical arms tearing up farmers and drug runners then dropping them into a sinister drug production line where they're ground down and end up in the nose of a British drug-user.

Client Leo Burnett London

Country Warsaw

Software 3ds Max, Photoshop, After Effects

Company Platige Image is a leading Polish studio with experience that comprises hundreds of opening credits, video clips, animated shorts and more. Its projects have been nominated for awards spanning from the SIGGRAPH CAF to the BAFTAs and Oscars.

Website www.platige.com

Contributors

Tomek Bagiński
Director

Grzegorz Kukuś
CG supervisor

Agata Socha
Producer

Piotr Jablonski
Art director/concept artist

Alan Uran
Compositor

Mateusz Bargiel & Gregorz Kukuś
Rendering artists

Damian Nenow
Animatic artist

Mateusz Gajewski & Artur Owsnicki
Modellers

Bartłomiej Walendziak
Texture artist

Mateusz Poplawski
Technical director

Directed by Rachel Seifert, *Cocaine Unwrapped* is a recently released documentary film exploring cocaine, its international distribution and the devastating effect it has on lives across the world.

In order to raise awareness of the documentary and its campaign, advertising agency Leo Burnett London hired Polish studio Platige Image to make a minute-long short that illustrates the theme of the documentary in an easy-to-understand manner.

"We've been co-operating for years doing commercial projects and this was a great opportunity to do something else within the same team," says the short's director, Tomek Bagiński. "The agency gave us a very good brief with lots of information on cocaine usage and distribution in the UK. I felt that the complexity and total range of the issue required a similar idea as seen in one of my previous animated shorts, 'Fallen Art'."

Like 'Fallen Art', 'Cocaine Unwrapped – The Machine' features a large contraption, this time tearing up Colombian farmers and Mexican drug runners and dropping them into a chugging production line. This mashes them into the white powder itself for the consumption of a British user. "The idea of the doom machine was very bold, and we knew it could end up quite expensive," says Bagiński. "Fortunately, we have a team of artists who combined 3D modelling with matte painting and then enriched the image with compositing, marrying technical simplicity with an artistic touch."

According to Bagiński the shoot wasn't too difficult: "There weren't any spectacular difficulties. We had our common vision and... the main challenge was to complete all the work within the set schedule and budget."

> "The idea of the doom machine was very bold, and we knew it could end up quite expensive" **Tomek Bagiński,** director

A This isn't the first project of Bagiński's to be slightly macabre. His 2004 short 'Fallen Art' has a machine that animates photos of a dead body, making them appear to dance

B Platige Image is perhaps best known for its short animations, such as 'Ark', directed by Grzegorz Jonkajtys, as well as 'The Great Escape' and 'Paths Of Hate' by Damian Nenow

C The most innocent characters in the trailer – the Colombian farmers – are depicted working on a lush green mountain range, before being plucked up by the mechanical claws

D The filmmakers used 3ds Max, Photoshop and After Effects to add a painterly look to the visuals. This stands in stark contrast to the dark gunmetal greys of the industrial elements

E This short is just another example of how powerful CGI can be. It doesn't always have to entertain, it can also be used to create powerful imagery that can help incite change

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Studio Access

Men in Black 3D

Sony Pictures Imageworks' Corey Turner discusses MIB 3's stereo 3D conversion in great depth

Sony Pictures Imageworks

Founded in 1992 in Culver City, California, Sony Pictures Imageworks has found great success over the years, having worked on films as diverse as *2012* and *Alice in Wonderland*. For *Men in Black 3*, the actual stereo 3D conversion was initially worked on by Prime Focus, a global entertainment services company that has provided such conversions for a large number of major studios.

www.imageworks.com

Project *Men in Black 3*
Description Will Smith and Tommy Lee Jones team up once again as Agents J and K in a bid to save the Earth. An alien criminal named Boris intends to assassinate K and change the course of history, meaning J must travel back in time to 1969 and team up with the young version of K (Josh Brolin) to finally put a stop to his plans
Country USA
Client Columbia Pictures
Software used View-D, Maya, NUKE, Katana

Key people

Barry Sonnenfeld
Director

Corey Turner
3D visual effects supervisor

Ken Ralston
Visual effects supervisor

Jay Redd
Visual effects supervisor

It's a common misconception in the world of film that a stereo 3D conversion is somehow cheaper than a film shot in native 3D, such as *Avatar*. This isn't always the case. For Corey Turner, 3D visual effects supervisor on *Men in Black 3*, the conversion approach was entirely beneficial to the production.

"When we first started we were looking at shooting native 3D, and we did a lot of camera testing," he remembers. "We tried to mimic a lot of Barry's (Sonnenfeld, director) shots, but we could never really get the camera as close to the actors as Barry wanted. He likes to pull in and push to these really tight close-ups."

The best way to achieve the shots Sonnenfeld wanted, while also creating an experience that popped out from the screen, was to convert the 2D image into stereoscopic 3D in postproduction. Turner was entirely confident the technique would not only deliver on the quality required from the presentation, but that it would also ensure a level of flexibility and customisation in the production process that native 3D couldn't provide. "For instance, our main villain, Boris, has long thin hair that's really wiry," says Turner. "We wanted to preserve all the detail there, so if there were a single hair sticking off to the side, we could make sure to carry that through.

"We could add more volume to characters' bodies – not just in the sense of a cylinder being thrown under there, but actually getting in there and doing detailed roto work on portions of the body so that we could give it shape. We could look at faces and round them off or taper them back so they felt natural. We could make sure that the whole film felt consistent to the way it would look if it were shot natively, or in many cases even better."

Creating inventive 3D visuals for the film wasn't just a technical challenge for Turner, but also a creative one. "We took on a lot of challenges and risks," he tells us. "There's an opening shot where Boris escapes from prison, for example, and we try and get him so he's jumping almost literally into the audience. His final position sees him standing and overlooking the audience – it's a really cool shot. We were actually blending together several different stereo rigs – they are virtual CG rigs, but they're blended together with several different stereo rigs in order to make the shot read properly."

The time-jump sequence – in which Agent J jumps from the Chrysler building and rushes towards the streets of New York – was another challenging shot

> "We don't want people looking at this and saying 'Oh it's a conversion movie'. We just want them to say that it's a 3D movie" **Corey Turner,** 3D visual effects supervisor

Portfolio highlights

Here are some of the big budget movie projects Sony Pictures Imageworks has worked on:

2011 *The Smurfs*
2009 *2012*
2009 *Watchmen*
2007 *Beowulf*
2004 *The Polar Express*
2003 *The Matrix Revolutions*
2002 *Spider-Man*
2001 *Harry Potter and The Philosopher's Stone*
1998 *Godzilla*
1995 *Die Hard: With A Vengeance*

A "We have scans of Will (Smith) at Imageworks from when he did *Hancock*," says Turner. "We would look at his facial structure and compare that to what we were sculpting in 3D to make sure his face shape was the same as in real life"

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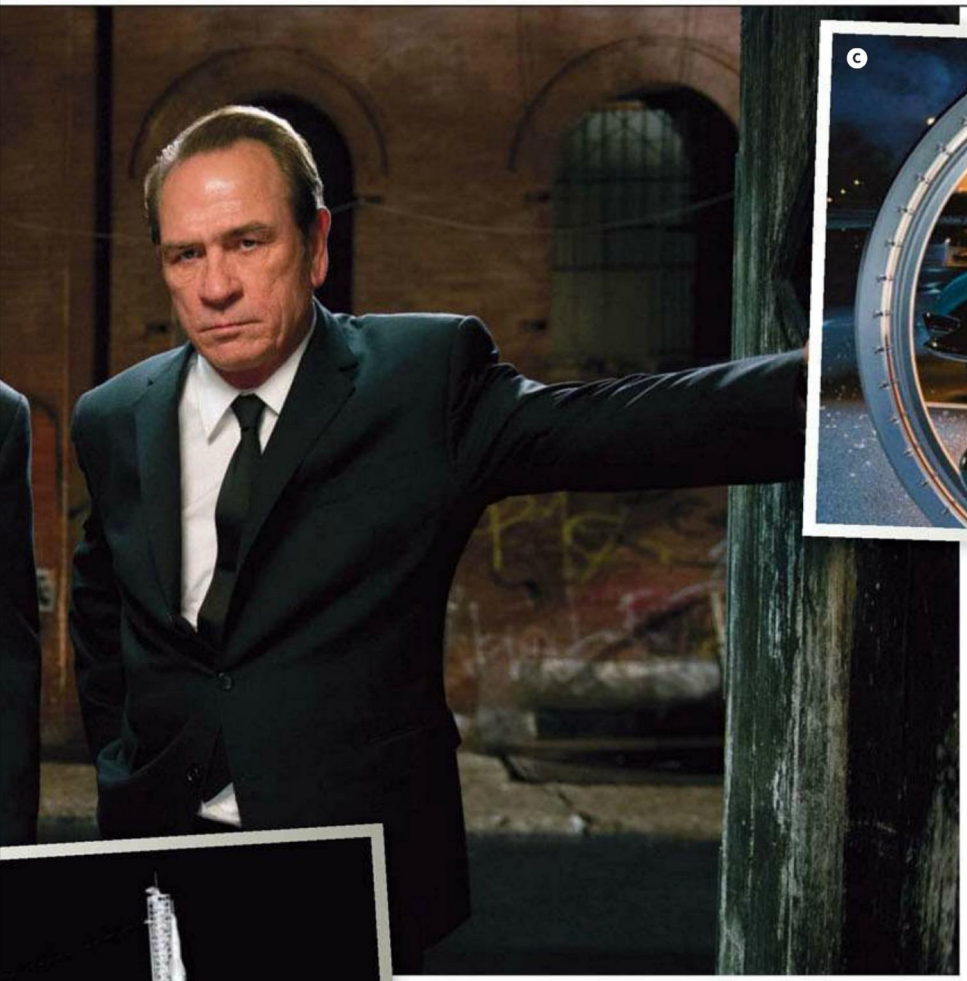

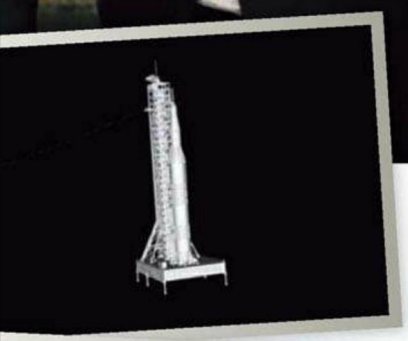

Turner was particularly pleased with. "Any time that [Agent J] is falling in the time jump, we're actually taking the background and racking the interaxial from really low values to really high values or vice versa, and then also just pushing it away with convergence," explains Turner. "The audience never really knows how high Will is off the ground. It was something that we did just to make it... more fun and playful; you really don't know how far [he's] falling."

Overall, Turner has been extremely thrilled with what he and his team has achieved with the conversion – perhaps more so than if it had been filmed in native 3D. "With *MIB 3* I had free rein. I could just go from shot to shot and really define the volume. It allowed for a lot of creative freedom. I think that we were able to come up with a customised look for this fanbase, where they're going to walk out of the theatre saying it was definitely worth watching *MIB 3* in 3D."

B "A lot of the end of the movie takes place on the launch gantry of Apollo 11," says director Barry Sonnenfeld. "To... have the action playing out against the countdown of that rocket is something we could only [do] in 2012"

C Imageworks used proprietary software that expedites stereo renders by re-rendering only specific parts of an element. This way the process takes hours rather than days

D "The 3D movie is a totally different movie than the 2D movie," Turner elaborates. "The 2D movie is still great, but the 3D element just adds an additional element to the storytelling"

E Creating a 3D live-action comedy was a new experience for Turner. The team used 3D to toy with user perception, and in some cases make the aliens feel stranger and more comical than they already appear

F The time jump shot, in which J jumps off the Chrysler Building, was one of Turner's favourites. "We made it so the audience feels like they're jumping off the building with [Agent J]; they feel really high up"

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Industry insider

Chris O'Riley

Owner: V4|Digital

We talk to self-professed jack-of-all-trades – and master of most – Chris O'Riley about combining 2D and 3D production techniques in the advertising, corporate and editorial spheres

About the insider

Owner V4|Digital
Location New Paltz, NY
Education Advertising and Commercial Art, Dutchess Community College in Poughkeepsie
Website www.v4digital.com
Biography A self-taught digital artist, Chris has been producing work for advertising, corporate and editorial clients for well over a decade. Combining 2D, 3D and retouching skills with an unmatched attention to detail, Chris produces striking imagery from concept to completion

A

For over a decade now Chris O'Riley has been creating imagery and design concepts for some of the world's biggest brands, with clients ranging from Fortune 500 companies to small, independent businesses. We sat down with Chris to discuss working for such a large client base in an industry that rarely demands the same thing twice.

3D Artist: *Advertising can be a fickle industry. How difficult is it to work in a business that's changing, and always insisting on something new and unique?*
Chris O'Riley: I think I would characterise it as more demanding than difficult. You learn to quickly break projects down and determine the best technique(s) to use for an image as a whole or for each individual element. As long as you're adaptable and flexible, it's not difficult. Demanding, on the other hand, is another beast entirely. Deadlines are tight to almost non-existent and expectations are always sky-high, which means sleep can often be a luxury. Overall though, it's the continual challenges and the fact that every job is new, different and unique that I enjoy so much. I enjoy the work because of the challenges.

3DA: *What tools and software do you often use?*
CO: I use LightWave 3D and modo, they're amazingly powerful, extensible and efficient applications that can handle everything from simple animations for the iPad to 30,000-pixel renders for billboards. While they may not have the glamour of high-end programs like Maya, they're both proven workhorse applications, with broad capabilities across the entire spectrum of work types and styles. This is especially important given that from one week to the next I can be called in for such a broad range of work.

3DA: *Could you walk us through your workflow? How do you modify if to tight deadlines?*
CO: I always err on the side of showing in-progress images early rather than later, but this changes depending on deadlines. With ample time, I'll take a piece much closer to completion before showing, whereas on a tight deadline I want to show the piece as early as possible so if there are any major changes, they can be determined.

Regardless of deadline, 3D elements are almost always handled first. I want to get the biggest potential unknown, final render times, out of the way as early as possible. You can retouch and add fine detail right up until a deadline, but you can't wait until the end to start a render that may take hours or days to complete.

3DA: *With technology continuously and rapidly evolving, how do you keep your skills in form?*
CO: Like any fast-paced industry, it's a trial by fire. Each job pushes your skillset by small (or large) amounts that, in turn, lead to more work that pushes your skills further still. I always like being challenged, some of my favourite jobs are where a client will ask for something that I've never done before, either conceptually or stylistically. They'll tell me their concept and ask if I can do it, to which I always [agree], only to hang up the phone and wonder to myself how on Earth I'm going to pull it off!

While I have a main set of tools and applications I use for most work, I'm always following and learning new programs. Every challenge has a solution, and the more tools in the toolbox, the easier, better and faster you can achieve it. There's a degree of stress to any occupation where success is based on always improving, but compared to the alternative – a monotonous job where you do the same thing, day after day – it's a stress I gladly accept!

C

B

Portfolio highlights

Some recent features that Chris O'Reilly has worked on:

2011 *[Digital] Modelling Fly*
2011 *Harman Kardon*
2011 *GolfDigest Augusta*
2010-12 *Clinique*
2010 *Water Bobbles*
2010 *Nickelodeon's Kanakas*
2010 *Sister Act*
2010 *Bridgestone Tires*
2009 *Porsche Panamera*
2008 *New Pepsi*

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D

E

F

Images courtesy of Chris O'Riley

Macro photography was used as reference to create this image for [Digital] Modelling, which features intricate details such as the fly's body plates, leg joints and segments, wing veins and eye faceting

G

Digitalised

We ask Chris how the transition of print to digital magazines is affecting his work

"More and more editorial clients are expressing interest in animated versions of print illustrations. So far, the animations I'm being asked for are relatively simple, but I definitely see them increasing in complexity as devices increase in performance. In the future I'm sure magazines will [change] from simple pre-rendered animations to fully interactive pieces. I would find it very exciting to build individual worlds or environments that the reader could interact with and that would respond to various inputs."

> "I always like being challenged, some of my favourite jobs are where a client will ask for something that I've never done before"

A Chris created this for *GolfDigest*'s iPad edition, showing each change made during the Augusta National Golf Club's 80-year history

B Working as an all-round generalist, like Chris does, means you have to be prepared for anything. Clients' demands can wildly vary

C A play on the word Shakers as referring to a religious sect, this salt and pepper family shows Chris's talent in creating glass textures

D Chris produced this image for a campaign for DIRECTV. CGI created the long, dark tunnel with the rest done in-camera and final retouching

E Chris transposed human features to mechanical ones with this 2010 Ford Mustang, distorting the lights and grill to look like a face

F This image was created as one in a series of product and packaging shots for the bobble, a water bottle with a fitted filtering device to re-use

G Chris made this image by mapping a photo onto a flat geometric plane, then merging it with the surface properties of the CG-created ice

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The best courses and freshest talent from around the globe...

Animation Major

Based in Vancouver, Emily Carr's Animation Major is ideally situated for a long and rewarding career in visual entertainment

There are few cities around the world better suited to study the ever-developing field of animation than Vancouver. That's not just because Vancouver has consistently featured highly in worldwide liveable-city rankings for over a decade. It's not just because Vancouver's beaches, mountains, arts and culture make for a breathtakingly beautiful tourist destination – although these are hardly off-putting factors. It's because Vancouver is a thriving hub in digital media. It's the third largest film production centre in North America, over a third of its jobs are in the creative sector and it was host to last year's SIGGRAPH.

Emily Carr is situated in the heart of the city on Granville Island, ideally positioned to both develop students' understanding of animation and also put them in good standing for a rich and rewarding career. The institute's four-year Animation Major prepares students for such opportunities through an open and flexible program that embraces diverse media.

Students develop as creative animation designers and critical thinkers through a program that encompasses 2D, 3D and interactive animation integrating a range of direct and digital approaches. Key skills taught include 3D modelling, texturing, rigging, character and effects animation, simulation, sound design, storytelling, editing and a great deal more. In the second year students work on short 30-second assignments and then expand their studio options in the third, exploring a range of available courses and cultivating their strengths in specific aspects of animation production. In the spring of their final year they begin creative research and development on their senior animation project, at which point they choose to direct their own film or work collaboratively in groups. They also define their career path and target audience for their work, choosing whether their animation project will be directed towards film festivals, industry employers or both.

"Our program has a legacy of short animation filmmaking," says Leslie Bishko, assistant dean at the Faculty of Design and Dynamic Media. "We focus on helping students become storytellers and creative animation designers who feel free to innovate and explore. Students learn how to become generalists, and are immersed in all aspects of the production cycle. This experience is key to their development of creative problem-solving skills.

"Our graduates have longevity within the industry in lead artist roles. Their generalist experience gives them confidence, and enables them to see the bigger picture."

> "I think of the Animation program at Emily Carr as being part of an overall animation ecology in Vancouver and Canada" **Martin Rose,** associate professor

Picture perfect

Surrounded by water, parks and coastal mountains, Vancouver is a stunning natural environment, and has long been recognised as one of the world's most liveable cities. Emily Carr itself is located on the central Granville Island. It was in the Seventies that Granville Island was converted from an industrial site into a colourful complex of studios, galleries, theatres, shops and a public market.

Vancouver is also home to an impressive list of local studios, including EA, Radical Entertainment, Rainmaker, Image Engine, Relic, Mercury Filmworks, Goldtooth Creative, Gloo Studios, Koolhaus Games and more. To learn more head to **www.reelwest.com**.

A The animation facilities include computer work stations, a full video studio as well as sound recording and editing suites

B Emily Carr offers internships, many co-op placements and an exchange program with 67 partners in over 20 countries

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Course details

Name Animation Major
Length Three years (four with a foundation year)
Website www.ecuad.ca
Fees Approximate over four years $7,750 domestic, $25,465 international
Entry requirements One foundation year (or equivalent transferred from another school) is a prerequisite to the program. Entry to the Animation Major is by GPA and portfolio assessment.

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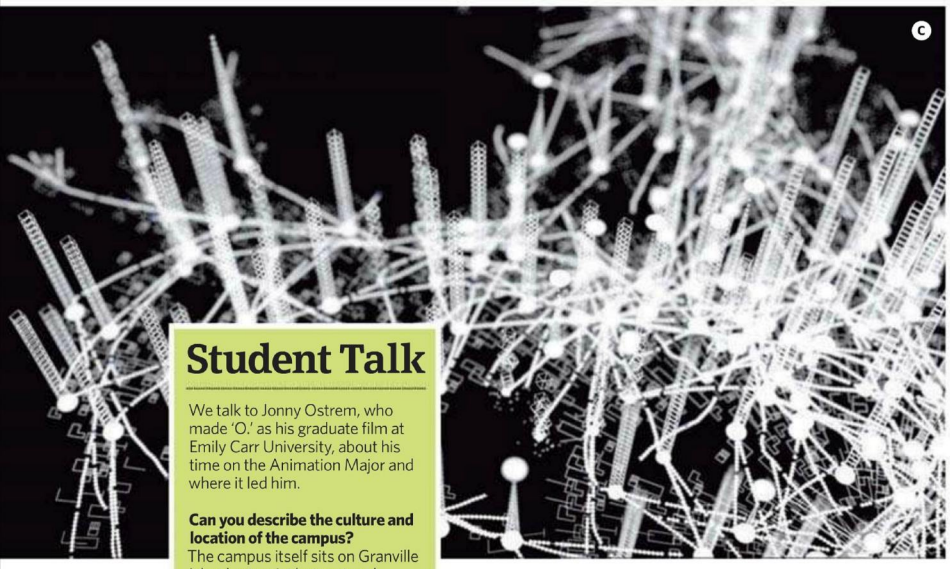
focus

STUDENT GALLERY

Students on Emily Carr's Animation Major have created an incredibly diverse selection of work, ranging from narrative-led shorts to abstract works of art



Student Talk

We talk to Jonny Ostrem, who made 'O.' as his graduate film at Emily Carr University, about his time on the Animation Major and where it led him.

Can you describe the culture and location of the campus?
The campus itself sits on Granville Island, a tourist hotspot and artistic microcosm 15 minutes from downtown Vancouver. It feels like you've got an entire world within walking distance of your studio space.

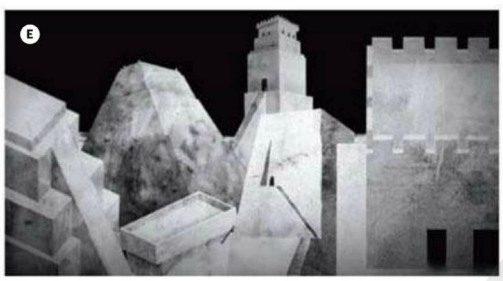
Within the Emily Carr campus is something completely different. You escape from the hustle and bustle of the busy island within the doors. The Animation department in itself is a much smaller subsection of the entire student body. It's a tightly knit 100 students or so brought together by some incredibly inspiring professors; they're all artists, independent animators and producers. They're always around to remind you that in the end, all the work is worth it.

What kind of projects have you worked on?
So many! There were the weekly animation exercises assigned by teachers: walk cycles, gravity studies, three-panel narratives, lip-syncing studies and so on. Beyond those curricular projects Emily Carr helps facilitate summer internships for those who apply. I worked as a background painter for a short web series animation, 'The Adventures of Artie the Ant'.

How has your professional life been since graduating?
The Vancouver Pacific National Exhibition was looking for artists to join in an art show celebrating their 100-year anniversary. The PNE contacted Emily Carr looking for said artists, and my graduation piece was chosen to be in the show. It was at the show that I met my employers, Gloo Studios.

Amber
» Jen Morgan
'Amber' tells two parallel stories of a pair of friends whose long distance relationship is faltering. The film is flatly rendered with toon shaders and painterly textures

Brotherhood
» Benjamin Tse
"I used Maya to rig the characters and animated them using video references of myself," Tse reveals. "I also used Maya's nCloth simulation to animate the capes, flags and fluid simulation for the effects"



C O.
» Jonny Ostrem
"An experimental animation exploring the emergence of biological and perceptual complexity within a chaotic universe," Ostrem reveals of 'O.'

D For You, My People
» Pablo Gonzales
'For You, My People' is an animated short that tells the story of a senator who must confront his secret deeds of corruption. More than 2,000 photographs were used

E Maze
» Martin Gilbert
"I am committed to integrating multiple art forms and mediums into animation," says Gilbert. "[It's] the most expansive art form yet, perhaps the least developed"

F Moksh
» Prajay Mehta
"In this animation, the water orb and water interaction was a bit of a hurdle as it was something I'd never tried before," Mehta comments on 'Moksh'

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